Medical Lib.
OCT 6 1927

The

British Medical Journal

THE JOURNAL OF THE BRITISH MEDICAL ASSOCIATION.

Including an Epitome of Current Medical Literature

WITH SUPPLEMENT.

No. 3481. SATURDAY, SEPTEMBER 24, 1927. Price 1/3

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ROUTINE EXAMINATION OF THE CEREBRO-SPINAL FLUID IN SYPHILIS:

*ITS VALUE IN REGARD TO MORE ACCURATE KNOWLEDGE, PROGNOSIS, AND TREATMENT.**

BY

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TO-DAY we know that dissemination of the organism takes place very rapidly after inoculation in syphilis. The first appreciation of this fact would appear to date from the realization that total excision of the early chancre does not abort the infection, as, for instance, in the case of the "malignant pustule" in anthrax. More recent experimenters have proved the presence of spironemes in the neighbouring lymph glands in rabbits in but half an hour following the cutaneous infection, and further, others claim to have obtained the organism from the cerebro-spinal fluid in the primary stages of syphilis in man.

The pathologists have provided us with a combination of most sensitive and accurate tests which can be applied to the cerebro-spinal fluid, by means of which we are enabled to detect the earliest evidence that the invasion has reached the central nervous system. Prior to this clinicians were dependent wholly upon the exhibition of signs and symptoms in a patient resulting from neural dysfunction—often irreparable—before such diagnosis could be arrived at.

Upon this early recognition of central nervous system involvement in syphilis depends so much with regard to subsequent management of the case and the prognosis from a neurological point of view. The examination of the cerebro-spinal fluid in syphilis, therefore, is imperative, and should be carried out as a routine in every up-to-date clinic.

In the earlier part of 1916, whilst in charge of the syphilis cases at Rochester Row Military Hospital, it occurred to me that with so much material at hand there was a good opportunity to carry out an investigation upon the cerebro-spinal fluid in syphilis in general. It was thereupon decided in future to examine the cerebro-spinal fluid prior to treatment in every patient. This was done, with the following results.

Primary Syphilis.

The number of cases of primary syphilis examined was 283. They comprised:

(*a*) Cases with negative blood Wassermann reaction	147
Number of these with pathological cerebro-spinal fluid	7 = 4.76%
(*b*) Cases with positive blood Wassermann reaction	136
Number of these with pathological cerebro-spinal fluid	18 = 13.23%
Total number of pathological cerebro-spinal fluids...	25 = 8.83%

Secondary Cases.

The number of secondary cases examined was 768. They consisted of:

(*a*) Previously untreated cases	559
Number of these with pathological cerebro-spinal fluid	178 = 31.8%
(*b*) Cases previously treated, showing relapse of blood Wassermann reaction within two years, with no clinical signs	62
Number of these with pathological cerebro-spinal fluid	27 = 43.5%
(*c*) Previously treated cases exhibiting clinical relapses of a "secondary" nature ...	147
Number of these with pathological cerebro-spinal fluid	69 = 46.9%
Total number of pathological cerebro-spinal fluids	274 = 35.4%

If we add the primary and secondary cases together we have a total of 1,051, in which were found 299 abnormal cerebro-spinal fluids (28.35 per cent.).

Extragenital Infections.

In view of the supposition that there is a high incidence of central nervous involvement following upon extragenital chancres, more especially with regard to those situated in close proximity to the brain, an analysis of the findings in these cases is given. With regard to the theory that direct invasion of the central nervous system might possibly take place by way of the perineural lymph channels, in these cases the distance to be traversed by the organism would be comparatively short.

The number of cases with extragenital infections examined was 35; the *Spironema pallidum* was detected in every chancre.

Of 29 secondary cases (advanced) the cerebro-spinal fluid was affected in	3 = 10.3%
Of the total 35 cases the cerebro-spinal fluid was affected in	4 = 11.4%

Taking into consideration the advanced stage to which the infection has progressed prior to examination, as is the rule unfortunately with these cases, one certainly would say, judging from this series, that the percentage of changes in the cerebro-spinal fluid is below the average found with genital infections of the same duration.

Tertiary Cases.

The total number of tertiary cases examined was 463. They comprised:

(*a*) Cases exhibiting active gummatous lesions ...	330
Number of these with pathological cerebro-spinal fluid	106 = 32.1%
(*b*) Cases with positive blood Wassermann reaction in which no active gummatous processes could be discovered	133
Number of these with pathological cerebro-spinal fluid	41 = 30.8%
Total number of pathological cerebro-spinal fluids...	147 = 31.7%

Congenital Syphilis.

The total number of cases (adults) examined was 87, of which 23 (26.3 per cent.) were found to have abnormal cerebro-spinal fluids. It must be pointed out that all these cases are from amongst men who had been passed for military service, and therefore the figures only apply to such cases as had escaped or survived some of the grosser stigmata associated with the congenital type of infection. Their ages ranged from 18 to 45 years. As might be expected, the large majority were cases of interstitial keratitis, of which there were 72, amongst which 14 (19.4 per cent.) were found with cerebro-spinal fluid changes.

Neurosyphilis.

The neurological cases investigated numbered 166, and the effect of various types of treatment was estimated by frequent clinical and pathological examinations.

With the evidence provided by the foregoing investigation, so amply supported by the findings of others, there can be no longer any question as to the absolute necessity of routine examinations of the cerebro-spinal fluid at all stages of the infection in syphilis. That the first attendance of a patient at a clinic should be accompanied by a minimum of discomfort, in order that an accurate diagnosis will be followed by a willing and regular attendance, is essential.

With this aim in view it might be urged that in the instance of the early case the performance of a lumbar puncture following upon scraping of the chancre, possible gland puncture, taking of the blood specimen for the Wassermann test, intravenous injection of arsenobenzol, deep subcutaneous or intramuscular injection of bismuth or mercury *plus* massage, might be calculated to increase the incidence of treatment defaulters. Here the personal equation, both in the surgeon and the patient, is a very important factor; an intelligent sympathy combined with gentle and careful technique in the former but seldom fails in engendering confidence and appreciation in the latter. It is wise to keep the patient in bed for the lumbar puncture, and for the ensuing twelve hours under aspirin and bromides. Unfortunately there is known, as yet, no infallible measure of eliminating that "bugbear" the reactionary headache; we can only lessen its incidence. Happily it is of the rarest occurrence in patients with grossly pathological fluids, and these are the cases in which frequent repetitions of spinal puncture are necessary.

If a patient is to be excused a lumbar puncture it is perhaps at the first attendance of the *primary* case that this might be permitted, but in such instances never should this examination be omitted at the termination of the initial course of treatment—that is to say, in the rest interval following upon the first ten to twelve arsenobenzol injections and their supplementary mercury or bismuth treatment. The subsequent progress of the untreated primary case with a pathological fluid should receive special scrutiny in this respect, and is one calling for somewhat more intensive early treatment than a similar case with a normal fluid at the onset. At all later stages of the infection an examination of the fluid should be insisted upon prior to drawing up the scheme of treatment.

[3481]

* A paper introducing a discussion in the Section of Venereal Diseases at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

	Blood Wassermann Reaction.	Cerebro-spinal Fluid.	Inferences.
Type (*a*)	Negative	Normal	The infection is well under subjection, and residual foci, if any, are inactive. Prognosis good.
Type (*b*)	Positive	Normal	Residual foci in general tissues as opposed to the parenchyma of the central nervous system, but early vascular lesions are not excluded. Prognosis good.
Type (*c*)	Positive ++	Wassermann reaction ++, ++, ++, ++, or +−, −− Cells 50 to 250 or more Globulin ++ Lange "luetic curve"	Points to active meningeal involvement. Prolonged and intensive treatment to be resumed at once, but commencing cautiously to avoid Herxheimer's reaction, "nipping" of cranial nerves, haemorrhagic encephalitis, etc. This is the type which in the absence of, or delay in "follow-on" treatment will develop "neuro-recidives." Subsequent cerebro-spinal fluid examination, after the meningo-vascular element is eradicated, will reveal the presence of possible coexisting parenchymatous involvement, though rare. With thorough treatment the prognosis is good.
Type (*d*)	Positive, but may be occasionally negative	Wassermann reaction ++, ++, +−, −−, or ++, ++ Cells 10 to 50 Globulin ± to + Lange "paretic curve"	Should be regarded as strongly suspicious of parenchymatous involvement of the central nervous system, and repeated cerebro-spinal fluid examination at three-monthly intervals whilst under continuous treatment is imperative, combined with careful clinical neurological investigations. More especially is the prognosis bad if an initial examination of the cerebro-spinal fluid prior to treatment revealed early changes. Prognosis: general paralysis of the insane and tabes are frequent in this group.
Type (*e*)	Positive	Wassermann reaction ++, +−, −− Cells 5 to 20 Globulin ± or absent Lange "luetic" or *nil*	Suggests residual foci in general tissues, *plus* meningo-vascular involvement of central nervous system—the meningeal factor slight or under subjection. Will probably show normal fluid after further treatment. In the absence of such is a likely candidate for cerebral endarteritis (hemiplegia, gummata, etc.).

In my opinion the most critical epoch in the career of a syphilitic is this period at the termination of the initial course of treatment, for, in the light of our present knowledge, not until now are we enabled to "gauge" with some degree of accuracy the "depth of penetration" of the invasion by its response to treatment. In fact, this first course of treatment should be regarded in the nature of a "therapeutic test," and should therefore be "standardized" to consist of the administration of not less than 4 grams of salvarsan (or the equivalent of neo-salvarsan) *plus* bismuth and mercury over a period not exceeding fourteen weeks.

It is now that an examination of the cerebro-spinal fluid, read in conjunction with the blood Wassermann reaction, affords such valuable information, and should be made six weeks after the cessation of the initial course of treatment, and prior to resumption. (During the first four weeks of this "rest period" the patient is usually given iodides.) The accompanying table may be found useful as a rough guide as to the significance of certain types of fluids met with at this stage as regards diagnosis, prognosis, and future treatment.

What importance should be placed upon these findings in the cerebro-spinal fluid in deciding upon the subsequent management of the case?

Type (*a*).

Provided that sound treatment is continued for a minimum further two years, in the absence of any pathological findings it should yield 100 per cent. cures. The cerebro-spinal fluid should be examined at the end of the first, second, third, and fifth years.

Type (*b*).

As above, excepting that the "two years" should date from the time that the blood Wassermann reaction was rendered negative. Several workers have noted that a normal fluid at this period is a very good omen that the central nervous system will not develop evidence of involvement subsequently.

Schmidt investigated, in after-years, 155 cases in which at the initial examination the cerebro-spinal fluid was normal prior to treatment, or had been found to be negative five years after the termination of treatment. In those cases tested the cerebro-spinal fluid was found to be still negative. Wild and Marshall stated that in several thousand cases in which lumbar puncture was performed a positive fluid was found in only three cases which had previously been found negative. Moore and Kemp consider that the evidence gained by the repeated routine spinal punctures in a series of 54 patients justifies a general statement that in early syphilis, if the cerebro-spinal fluid is normal after six months' treatment, the patient will not develop clinical neurosyphilis, nor a positive fluid, unless a second dissemination of the organism is permitted to take place, as evidenced clinically by recurrent secondary syphilides or a blood Wassermann relapse. Fordyce has stated that if the cerebro-spinal fluid is once found to be normal after treatment the probability is that the central nervous system will not be affected subsequently.

Type (*c*).

Changes as gross as those to be found only six weeks after cessation of arsenobenzol therapy would indicate severe meningeal invasion such as is more likely to be experienced after a longer rest from treatment. Moore and Kemp found the average time interval between the day of the last treatment and the onset of neuro-recurrences in 27 such cases to be 2.1 months. Kemp and Chesney reported a case in which syphilitic meningitis of the neuro-recidive type developed four months after cessation of treatment, which had been commenced in the primary sero-negative stage. Three cubic centimetres of the cerebro-spinal fluid (which was positive to all tests) was inoculated into a rabbit's testicle. Approximately sixty-eight days later the animal developed an orchitis, in which numerous *Sp. pallida* were demonstrated fourteen days afterwards.

Such relapses were seen far more frequently in the early days of arsenobenzol therapy when the dosage was what we know now to be very inadequate—in fact dangerous—in that it was usually sufficient to inhibit the natural output of antibody by effecting a temporary suppression of spironemes. Thus when residual "nests" of the organism awoke to renewed activity—whether situated in the meninges or elsewhere—they did so, as it were, upon virgin soil, just as in the secondary stage of the untreated case; in fact it seems possible that a second dissemination could take place. It is by means of the early recognition of meningeal involvement by routine examination of the cerebro-spinal fluid during this pre-symptomatic period that we are enabled entirely to prevent, by immediate resumption of treatment, the development of such evidences of gross inefficiency as cranial palsies, etc. In the type under discussion it is certain that the "protective mechanism" of the central nervous system has been called into action, and it is only by subsequent examination of the cerebro-spinal fluid, after the meningo-vascular element has been cleared up by treatment, that its efficacy in protecting the parenchyma is revealed.

The prognosis, assuming that the condition is recognized in the asymptomatic stage whereby prompt and intensive treatment can be cautiously resumed, is good. If irreparable damage has been caused prior to the resumption of treatment the processes can be arrested with perseverance, but permanent dysfunction will persist in proportion to the extent of neural destruction. Routine examination of the cerebro-spinal fluid should render impossible the development of any such disabilities. It is recognized by all that the case which relapses once is very prone to exhibit subsequent recurrences.

Type (d).

The importance of the early recognition of this type cannot be overestimated as regards diagnosis, treatment, and prognosis. It is in this group, perhaps more than in any of the others, that the findings at the initial pre-treatment examination of the cerebro-spinal fluid convey most. Should the first examination have revealed early changes, which under the "test" course of treatment have progressed as indicated, the presumptive evidence of parenchymatous involvement of the central nervous system is very strong.

With this evidence before us some workers go so far as to state that we are no longer justified in continuing treatment along the lines of the ordinarily accepted schemes of intravenous or deep-subcutaneous arsenobenzol therapy, whereby valuable time is allowed to elapse, during which the progress of the parenchymatous invasion is not materially checked. They urge that, at once, more drastic procedures should be employed. Bunker advocated the following four lines of therapy should the positive Wassermann reaction and paretic gold curve be present in the cerebro-spinal fluid after the initial course of treatment:

1. Intraspinal injections by Swift-Ellis technique at short intervals.
2. As above, supplemented by intra-cisternal injections.
3. Thorough trial of tryparsamide.
4. Treatment with malaria.

He feels that two weeks given over to malaria in these "pernicious" cases may be worth several months under the other schemes of treatment, with which the malaria can be immediately supplemented. Kyrle of the Vienna school advocates an earlier exhibition of the malarial treatment in those cases of syphilis with resistant serological or cerebro-spinal fluid findings, rather than reserving it, as hitherto, for the proclaimed tabetic or paretic. Any treatment which has been proved capable of rendering normal the cerebro-spinal fluid in a general paretic should be given *at this period* to the type of case under discussion. Massive doses of silver-salvarsan intravenously, accompanied by sulfarsenol deep-subcutaneously, *plus* spinal drainage, has been spoken well of by Harrison in this respect in an advanced paretic.

Type (e).

Early recognition of the cases coming within this category is second in importance only to that of the preceding group, because, in the event of the immediate resumption of treatment which is hereby indicated, the prognosis in the great majority is good. On the other hand, in the absence of such resumption or where a protracted rest interval is followed by inadequate supplementary courses of treatment, the clinical disasters resulting from endarteritis of the central nervous system are of an alarming nature. The "plegias" always leave in their wake a varying degree of permanent damage, no matter how efficiently the case is treated after the onset of such. In the syphilitic who is willing to remain under prolonged observation, during which the blood Wassermann reaction and cerebro-spinal fluid are tested at regular intervals, endarteritis of the cerebral, spinal, or, in fact, any vessels, should never be allowed to progress unsuspected in the absence of treatment.

Possessed as we are to-day of modern improvements in specific therapy and the delicate tests for controlling the response of an infection to such, the development of, say, hemiplegia in a known syphilitic is to be regarded as the fault of the doctor or the patient—perhaps both—but not the disease. The findings in the cerebro-spinal fluid as indicated in this group might equally well occur with an early mild meningeal involvement, or one which has been partially cleared up by the initial course of treatment.

It matters nothing, however, whether it is the meninges or the vessels which are principally involved at this stage; what is of paramount importance is the immediate necessity for the resumption of treatment. Re-examination and comparison of the findings in the cerebro-spinal fluid after each "follow-on" course of treatment will provide most valuable data in assessing the accessibility of the spironemes in a particular infection. Upon these findings everything will depend in deciding the subsequent management of the case.

The Importance to be placed upon the Various Tests and their Significance.

Lange Colloidal Gold Reaction.—Although the results obtained from its employment are not recorded by me in the series of cases mentioned, this test was used in all of the frankly neurological cases and, subsequently, to assess progress in the majority of those other cases in which a grossly pathological fluid was discovered at the first examination. The utmost care in the preparation of the colloidal gold solution and the cleansing of the glass utensils has a very important bearing upon the "readings" obtained with the test. From my clinical observations over the past ten years of the progress of a considerable number of neurosyphilitics, I am firmly convinced that a strong paretic curve, accompanied by a persistent positive Wassermann reaction in the cerebro-spinal fluid, is to be regarded as of the gravest prognostic significance. Miller and his collaborators found, upon examining the cerebro-spinal fluid from 252 cases composed of paretics, tabetics, and of cerebro-spinal syphilis, that the Lange reaction was invariably positive when the Wassermann test was positive, and in 4 cases was positive when the Wassermann test was negative. Wrendt considers its sensitiveness one of the main advantages of the colloidal gold test, in that it may indicate the necessity for further treatment when all other tests are negative. He also regards an early strongly paretic type of reaction in syphilis as an omen for a bad prognosis. Hunt believes that the "gold-sol," next to the cell count, is the most important of the four main tests supplied by the cerebro-spinal fluid, and in his experience has proved that most sensitive and delicate. It is both of diagnosic and prognostic value; it forecasts the future development of the disease more than any other laboratory measure. The gold curve, he considers, can be used as a guide, and with its first tendency to simulate the curve of paresis the malarial treatment could be instituted.

The Wassermann Reaction in the Cerebro-spinal Fluid.—It is infrequent to find a positive reaction in the cerebro-spinal fluid in the *primary* stages, and then only with two volumes of fluid, more rarely with one volume. In none of the primary cases in my series did it occur with the smallest amount of fluid. In the *secondary* cases one more frequently meets with stronger reactions, especially in the "relapse" cases. Amongst these the "meningo-" or "neuro-recidive" cases, in conjunction with a high cell count and excess of globulin, the Wassermann test may show ++ throughout the four dilutions. It is in this type that the Wassermann reaction in the cerebro-spinal fluid is most easily influenced by treatment, but may remain refractory with two volumes of fluid for a long time after the cells and globulin have disappeared. In later cerebral syphilis of the meningo-vascular type much the same conditions in the fluid commonly exist. Of all syphilitic conditions the Wassermann reaction is most constantly strongly positive in the cerebro-spinal fluid in general paresis, and also the most difficult to influence by treatment. In tabes it is somewhat more responsive, and especially is one liable to be too optimistic in the earlier part of treatment when the coexisting meningo-vascular element is being brought under subjection, as evidenced by the decrease in cells and globulin, and possibly the Wassermann reaction to a less degree. Eventually, however, a stage is reached when the Wassermann reaction remains rigidly positive with two volumes and with one volume of fluid, with the cells swinging between 5 and 15 per c.mm., which one feels to be representative of the true residual parenchymatous involvement. A persistent positive Wassermann reaction in the cerebro-spinal fluid after the initial course of treatment in the early, or, in fact, any stage of syphilis, should always be regarded as an absolute indication for prolonged and intensive continuation treatment, controlled by re-examinations of the cerebro-spinal fluid at regular intervals, at which the

Lange test is never omitted. I regard a positive Wassermann in the cerebro-spinal fluid as an indication of the existence of spironemes within the central nervous system, and cannot accept Dujardin's theory that the Wassermann substance is not formed within the central nervous system, its presence in the cerebro-spinal fluid being dependent upon the permeability of the capillary walls to permit of its passage from the blood into the perivascular lymph spaces or not. We frequently meet with a positive Wassermann reaction in the cerebro-spinal fluid accompanied by a negative in the blood, a condition which can exist for many months and remain constant in spite of exhaustive spinal drainage up to 80 or 100 c.cm. twice weekly. Moreover, the organism has been proved to exist in the cerebro-spinal fluid, and interstitial and parenchymatous central nervous tissues.

Cells and Globulin.

"There is never smoke without fire," and in syphilis the cells and globulin in the cerebro-spinal fluid might be regarded as fairly reliable indicators of the intensity of the inflammatory meningeal blaze; thus in syphilis a severe involvement of the meninges is responsible for a gross excess in each, as with other infections. An increase in cells of from 5 to 10 was the most frequent first change to appear in the cerebro-spinal fluid of the primary cases previously described, the excess in globulin coming next, with a positive Wassermann reaction rare in comparison, and then usually accompanied by a pleocytosis. The detection, therefore, of an excess in cells or globulin in the cerebro-spinal fluid is invaluable in furnishing the first evidence of central nervous involvement in syphilis in order that treatment can be planned accordingly and its efficacy judged by subsequent examinations of the cerebro-spinal fluid. Some observers have found an invariable increase in pressure in fluids showing this early pleocytosis.

Should a cell count of, say, 8 to 15 be returned, after the initial course of treatment, as the only abnormality, I consider it to be an indication to push treatment, but would regard a solitary slight excess of globulin as of less importance, since it can persist over very long periods in cases which, by prolonged observation, have been proved subsequently to do well.

Since the methods are so simple it is better in the routine examination for globulin always to employ both the Pandy and Nonne-Apelt methods, for, as Greenfield and Carmichael point out, whereas a trace of globulin might be detected by the one, a negative with the other test would prove it to be within the normal limit.

Some General Views Expressed by Various Investigators.

O'Leary, Paul, and Nelson call attention to the fact that neurosyphilis may progress clinically in the presence of completely negative cerebro-spinal fluid findings. They found that continued treatment after the cerebro-spinal fluid has become negative is productive of 70 per cent. of clinical benefit, and 45 per cent. in those whose fluids returned to normal without treatment. They conclude that yearly investigations of the cerebro-spinal fluid *plus* clinical examinations should be made in all neurosyphilitics whose fluids have become normal, with or without treatment.

Bunker asserts that the purely clinical differentiation between the meningo-vascular and parenchymatous forms of neurosyphilis not only often presents considerable difficulty, but is, in fact, sometimes quite impossible during life. It matters but little what label one may elect to apply—meningo-vascular or parenchymatous, mesodermal or ectodermal; what, however, is of paramount importance is whether the treatment is proving efficient in a given case of neurosyphilis regardless of such label. This can only be judged by the definite and progressive influence exerted upon the positive findings in the cerebro-spinal fluid. This evidence cannot be obtained without repeated examination of the cerebro-spinal fluid as treatment progresses. A single examination of the cerebro-spinal fluid he regards as of about as much value as a single temperature reading in any acute infection. He points out how misleading and of what little value symptomatic amelioration may be in the absence of concomitant improvement in the cerebro-spinal fluid.

Fordyce pointed out that the signs and symptoms of involvement of the nervous system in the early months are sometimes absent or are so indefinite as to be easily overlooked. If lumbar puncture is limited to the cases with obtrusive signs irreparable damage may result—a low-grade parenchymatous encephalitis, with slight or no meningeal involvement, may exist for years with indefinite symptoms impossible to classify or interpret without the aid of spinal fluid tests. The absence of the paretic gold-sol curve in the majority of cases definitely excludes paresis. Cerebral meningo-vascular syphilis and general paralysis may give identical findings in the cerebro-spinal fluid and present very similar clinical pictures. The persistence of a strongly positive Wassermann reaction in the high dilutions with a paretic gold curve after intensive and prolonged treatment is the only practical way of differentiating these closely related clinical conditions. He and his co-worker (Rosen) had yet to detect a recurrence in an early case of neurosyphilis which had been discharged with a negative cerebro-spinal fluid after adequate treatment, or to observe a late infection of the fluid in one shown to be normal in the first two years of the disease. He considered that if the nervous system is not involved in the early period of the infection it is extremely improbable that it will be at a later date; vascular lesions and gummata being excepted. Certain types of neurosyphilis, including the purely vascular, the gumma unaccompanied by a meningitis, some unusual psychoses, and epilepsy of luetic origin, are often found with little or no change in the cerebro-spinal fluid. These exceptional conditions in no way alter the general rule that the cerebro-spinal fluid reflects the pathological process in the brain and cord.

Mott considered it probable that the cases in which the cerebro-spinal fluid remains positive after prolonged treatment are those which subsequently (average ten years after primary infection) develop tabes and general paresis. There is hardly any organic disease of the nervous system which may not be simulated by syphilitic disease, but, he added, it must be remembered that functional diseases may occur in syphilitic subjects. Neurasthenia *plus* syphilophobia, on account of the venereal disease propaganda, is frequently met with at the present time. (Another strong indication of the value of cerebro-spinal fluid examination.)

In a paper upon the diagnosis and treatment of neurosyphilis Hunt makes the following very sound observations. "The most successful diagnostician of all is he who has the clinical reports in his right hand, those from the laboratory in his left hand, and the patient in front of him." The reason for erroneous diagnosis and for unrecognized neurosyphilis is largely the fault of the physician; "it arises from his unwillingness to do a lumbar puncture." And again: "No neurological diagnosis should ever be made until syphilis has been eliminated by an examination of the cerebro-spinal fluid, and no diagnosis of neurosyphilis ought to be accepted until the cerebro-spinal fluid has been examined." In the vast majority of cases he considers that this one test will settle the question.

Conclusions.

1. Routine examination of the cerebro-spinal fluid is absolutely essential in the management of syphilis.

2. The cerebro-spinal fluid furnishes the earliest and most accurate indications governing diagnosis, treatment, and prognosis.

3. In the primary stage it is an advantage, in the later stages imperative, to know the condition of the cerebro-spinal fluid prior to the commencement of treatment.

4. The cerebro-spinal fluid should be re-examined after a period not exceeding six weeks from the cessation of the initial course of treatment, such "standardized" course of treatment to be regarded in the nature of a "therapeutic test."

5. In the earlier cases this is the most critical period in the management of the infection, since it is now that the cerebro-spinal fluid might provide possibly the first and only evidence to indicate invasion of the central nervous system, and within broad limits the depth of such invasion when present.

6. The warning obtained from routine cerebro-spinal

fluid examination at this period should prevent entirely the subsequent development of meningeal relapses, and their sequelae.

7. A positive Wassermann reaction in the cerebro-spinal fluid (especially if such existed prior to this initial course of treatment) accompanied by a paretic Lange curve is strong presumptive evidence of parenchymatous involvement of the central nervous system at this stage. Revised intensive schemes of treatment should be instituted forthwith for its eradication, by which much valuable time may be saved.

8. In every early case treated *ab initio* subsequent examination of the cerebro-spinal fluid should be made, accompanied by the blood Wassermann test at the termination of the first, second, third, and fifth year. Concurrent treatment and subsequent management to be controlled thereby.

9. All cases presenting a persistent positive blood Wassermann reaction, no matter at what stage of the infection the patient first comes under observation, should have the cerebro-spinal fluid investigated, accompanied by a careful neurological examination. The disasters attendant upon cerebral and spinal endarteritis would be anticipated thereby and entirely prevented by adequate treatment.

10. A routine blood Wassermann test should be made upon every patient at all medical institutions, irrespective of the nature of the complaint, and when found to be positive an investigation of the cerebro-spinal fluid should follow.

11. Once the cerebro-spinal fluid has been found to be pathological in a syphilitic case, subsequent examination of the fluid is imperative for many years after it has been rendered normal.

12. Especially are regular re-examinations indicated in those cases which have once relapsed, and in proclaimed cases of neurosyphilis after the fluid has become normal. The old aphorism, "Once a neurosyphilitic always a neurosyphilitic," must never be regarded lightly.

13. Neurosyphilis—more especially of the vascular type—can progress clinically in the presence of negative findings in the cerebro-spinal fluid, yet it can be much benefited by specific treatment. Much valuable assistance, therefore, is to be obtained from the skilled neurologist in assessing progress in such cases, and should always be sought.

14. The earlier treatment is commenced in the infection the greater the chance of preventing syphilitic involvement of the central nervous system; the earlier the recognition of such, should it have occurred, the greater the possibility of preventing the invasion of the parenchyma.

15. No patient with a history of syphilis should be given permission to marry without an examination of the cerebro-spinal fluid.

DISCUSSION.

DR. G. RIDDOCH (London) said that a balance had to be struck between positive pathological changes in the cerebro-spinal fluid and negative clinical findings. If, after the initial six weeks' course of treatment, there were such pathological changes the patient should be treated for the rest of his or her life, or, at any rate, should be kept under periodic inspection. It might be asked whether a patient in whom the cerebro-spinal fluid had become negative after having once been positive was safe after five years had elapsed; the answer must be in the negative, for he might get tabes with an apparently normal cerebro-spinal fluid. It must be remembered that it was the business of the physician to treat human patients and not positive Wassermann reactions. Moreover, the remedies employed were poisonous, and it was possible to overdo antisyphilitic therapy. Severe headaches were liable to follow lumbar punctures, and one such might make a patient rebel against any further examination; hence it was important to take every precaution, one of the essentials being the use of a fine needle.

DR. D. K. HENDERSON (Glasgow) thought that routine examination of the cerebro-spinal fluid was open to serious objection because in not a few cases the after-effects were serious. In his opinion it was essential that the patient should be kept in bed for at least twenty-four hours after the puncture. The early diagnosis of parenchymatous syphilis was impossible, because patients with only the slightest clinical signs might present advanced pathological changes in the cerebro-spinal fluid. It often happened that the earliest cases, and consequently the most promising, turned out the most disappointing in treatment, while others who came under observation comparatively late did relatively well. There also occurred cases of tabes and general paralysis which showed no apparent pathological change in the cerebro-spinal fluid. He considered that no patient who had had general paralysis, even if supposed to be cured, should ever be allowed to hold a position of responsibility.

DR. J. G. GREENFIELD (London) described several tests for the cerebro-spinal fluid in neurosyphilis, and said that the Kahn test was very fairly comparable with the Wassermann test, but it was sometimes weakly positive when the latter was negative. The test of Boltz was almost specific for general paralysis. Other tests recommended were those of Kafka, which corresponded with Lange's test, and Wu's colorimetric estimation of protein for estimating the actual quantity of protein present in the cerebro-spinal fluid. General paralysis was the only condition in which the globulin approached the albumin in quantity in the cerebro-spinal fluid. The Wassermann body was probably formed in the meninges, but this could not be considered proved. The persistence of a positive Wassermann reaction in the cerebro-spinal fluid was the strongest proof that the patient was suffering from general paralysis, not cerebro-spinal syphilis.

COLONEL L. W. HARRISON (London) called attention to the fact that the term "spironeme" had now been disowned by its sponsor, Mr. Clifford Dobell. A compromise might possibly be found by testing the cerebro-spinal fluid for the first time in cases selected according to their behaviour to the first course of treatment. He had found at St. Thomas's Hospital that cases which were still seropositive at the end of their first course of treatment remained so for numerous subsequent courses; in many of these the cerebro-spinal fluid was persistently positive. On the other hand, he had not found a single positive cerebro-spinal fluid in a case with a negative blood reaction at the end of the first course of treatment. He thought, therefore, that only those patients with a positive blood reaction at the end of the first or second course of treatment need have the cerebro-spinal fluid investigated, though it should be examined in all cases before discharge from treatment. Some means ought to be found for making the tissues of these non-responsive cases react better. Very little work had been done on the subject, but Major Pettit had reported some time ago that at Rochester Row an unresponsive early case had been made responsive by the administration of thyroid extract. By this means or by protein shock therapy something might be done to change the outlook. He was convinced that the employment of arsenobenzol simultaneously with another metal was followed by a much smaller incidence of nerve palsies than when arsenobenzol was given alone or was followed subsequently by a course of mercury or bismuth. In his own clinic, where the combined method was used, there had not been a single case of a cranial palsy, while at Johns Hopkins, where the "tandem" principle was followed, they had had 58 cases of neuro-recurrence out of 2,500 cases of early syphilis. In the early days of arsenobenzol therapy, when salvarsan was used alone, there had been a large number of neuro-recurrences, and in his own experience it had been mostly in the purely arsenobenzol treated cases that clinically manifest recurrences had occurred. If a system such as the simultaneous arsenobenzol and mercury (or bismuth) treatment was attended by a smaller incidence of neuro-syphilis than was the case when arsenobenzol was employed first and mercury (or bismuth) afterwards, the former seemed preferable.

MR. VOGE (Edinburgh) read a preliminary note of a test devised by Dr. W. O. Kermack and himself. Wright and Kermack had shown that when colloidal gum benzoin was precipitated by varying concentrations of cerebro-spinal

fluids of different degrees of acidity, the abnormal fluids from a case of general paralysis of the insane were characterized by the development of a zone at a *p*H 5-8, under conditions which precluded the appearance of this zone when a normal fluid was employed. Syphilitic serums were in general distinguished from normal serums by the development of a similar zone at a concentration of serum varying from 1/4 to 1/16 of the undiluted serum. It had previously been suggested that this abnormal zone of precipitation might be occasioned by the presence of a protein of high iso-electric point. It had been found that clupeine, a protamine derived from herring milts, when added in the requisite small amounts to normal cerebro-spinal fluid or serum, caused these fluids to simulate syphilitic fluid and serum in their behaviour towards gum benzoin. An attempt had been made to obtain evidence as to whether a basic protein was actually present in excess in syphilitic body fluids. The reaction of Sakaguchi (development of a red colour by protamines and other compounds containing a free guanidine group when treated with naphthol and sodium hypochlorite) had been slightly modified and applied to syphilitic serums and cerebro-spinal fluids. The preliminary results indicated that in fluids and serums of syphilitic origin the red colour developed more readily than in normal ones, and a high degree of correlation appeared to exist between the results of this colour test and the Wassermann test.

Dr. FREMONT SMITH (Boston, U.S.A.) agreed that it was of great importance to make the taking of cerebro-spinal fluid from patients by lumbar puncture as painless and free from unpleasant after-effects as possible. He said that by using a local anaesthetic and a small needle, and keeping the patient in bed, he was able to make this operation quite free from drawback.

The PRESIDENT of the Section gave a clinical demonstration of about twelve cases of neurosyphilis, especially with a view to showing the results of treatment, chiefly by tryparsamide, which he had used in large doses without ill effect but with great benefit to the patient. The cases included several of juvenile general paralysis, also of acquired general paralysis of the insane, and of tabes. In many of these cases the results of treatment were striking and impressive. The President did not claim that it was possible to restore the afflicted individual to a strictly normal condition, but he did suggest that they were often able to arrest the degeneration of the nervous system and retain the patient as a useful member of society, able to work and self-supporting.

DISCUSSION
ON
EPIDEMIC ENCEPHALITIS.*

I.—EPIDEMIOLOGICAL CONSIDERATIONS.

BY

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HAPPILY it is not expected that in opening a discussion the speaker should make a systematic survey of the subject under review. He may assume that those who may take part are already familiar with the main facts and features of the subject, and it is his business to make appropriate and, if possible, provoking remarks, thus focusing attention on some of the problems suggested by his own experience.

In seven successive years, from 1918 till 1924, the attention of the profession in Glasgow was directed to a "new disease," accounts of which had come during the same period from various parts of the world, and a description of which had already been given a year earlier by von Economo in Austria. That it was new admits now of no question, for there is nothing in the literature of medicine to compare with the phantasmagoria of disorder manifested in the course of this strange malady. There is scarcely a sign or symptom of nervous derangement which did not at one time or another make its appearance during the epidemics. Into the maze of contradictory phenomena it seemed almost impossible to read anything like a rationalized order of events which might be termed a disease entity. Profound and prolonged torpor, protracted and resistive sleeplessness, paralysis, violent jactitation, chorea, athetosis, and convulsions, pains referable to the head, limbs, and internal organs, every conceivable anomaly of movement of the external and intrinsic muscles of the eye, giddiness and rotatory displacement of the body, abnormal reactions of alimentation, circulation, and respiration, delirium, maniacal excitement and fever, comprise some of the outstanding features of this picture of chaos.

The original attempts to interpret the phenomena in the light of nosological principles took various directions. An anatomical basis was soon established in the non-purulent form of encephalitis which was discovered in every case which came to *post-mortem* examination. One result of this discovery, however, was to transfer the confusion to another field of discussion. Non-purulent encephalitis had been described in a variety of diseases. It was present in the cephalic form of poliomyelitis, in the cerebral paralysis of children, in Wernicke's syndrome, and as a sequela of a number of acute infections, chief among these being influenza.

The prevalence of influenza at the time of the outbreak lent colour to the view that the new disease was associated with that infection. There were others who, inspired either by aversion to "new diseases" or by doubt as to the existence of anything which might be termed a "disease entity," sought refuge in the proposal to regard the phenomena as a form of polio-encephalitis. Objection, moreover, was taken to the term "lethargic encephalitis," because, on the one hand, lethargy was not invariably present, and, on the other hand, the morbid reaction was not always confined to the encephalon.

Classification of symptoms, pathological anatomy, and logical disputation failed individually and collectively to unravel the tangle which the initial stages of the epidemic presented. The efforts of the laboratory were no more successful, for examination of the cerebro-spinal fluid and bacteriological investigation afforded no data of importance, and experimental research gave no results. It is a striking commentary on the nature of morbid processes, and on the part which the clinician plays in their interpretation, that the disease had to reveal its own identity in the course of time before it could be even partially understood. It soon became apparent that, however obscure the microbic origin, however bizarre and baffling the preliminary disturbances, the tendency of the human organism to preserve its identity found expression in the long run in sequelae which constituted a fairly reliable standard of reference. It is just this issue of encephalitis in peculiar and characteristic sequelae which justifies its recognition, not only as a disease entity, but as a new disease.

For what is it that constitutes a "disease entity" or a "new disease"? The physician is concerned not, like the naturalist, with a wide range of different organisms theoretically adapted in an average way to an average environment, but with a single organism, the human subject, striving to preserve its identity in adverse circumstances. In this struggle all those tendencies and activities which are stabilized in the processes of normal life assert themselves. The conflict is not confined to the part first afflicted. The unity of the organism provides for the participation of a variety of immediate and distant reactions in the attempt to maintain or restore order. If the initial assault be severe, as in an acute infection or a cerebral haemorrhage, confusion and disorder are likely to prevail. If this stage be survived, the course of events will be determined by the extent of the damage and by the efforts of the organism, successful or otherwise, to restore a state of equilibrium.

It is the organic substratum to the chaos of disease that has a deciding influence on the course of the morbid process: it determines the tendency of disease to manifest

* This discussion took place in the combined Sections of Mental Diseases and Neurology at the Annual Meeting of the British Medical Association, Edinburgh, 1927, under the chairmanship of Professor Edwin Bramwell.

itself only in a limited number of ways, and it also determines the more or less constant features of each manifestation. These tendencies are exhibited to advantage in disorders of the great integrating systems of the organism, and especially in the nervous system; it is just these tendencies that render possible the classification of disease.

There enter into the concept of a disease other considerations which have reference to its incidence, as well as to its course. In the case under review we attribute its origin to an infective agent; we interpret the initial symptoms as due to the irritation and destruction of nervous elements for which the poisons of the infective agent have a special affinity; we explain the late and permanent symptoms as expressions of partially successful or unsuccessful efforts of rehabilitation.

In claiming for lethargic encephalitis the status of a new disease entity it is contended:

1. That while nothing is known of the toxic agent except that it produces encephalitis, it is not the toxic agent of influenza or of poliomyelitis or of herpes.
2. That the sites of toxic reaction in the central nervous system are peculiar to lethargic encephalitis, and are distinct from the sites involved in other forms of encephalitis, such as cerebral influenza, polio-encephalitis, Wernicke's disease, and the cerebral palsies of children.
3. That the sequelae of encephalitis, while they are the hall-mark of the disease, are not phases of progressive infection, but phases of attempted adaptation.
4. That the history of the successive epidemics in Glasgow indicates a change of type which is not recognized in any other infection of the central nervous system.

These contentions are based on an experience of the disease extending over nine years. During this period about six hundred cases have been examined, and two hundred of these have passed through my own wards in the Eastern District Hospital and Victoria Infirmary. The brain and spinal cord of forty cases which came to the *post-mortem* rooms have been examined. Through the courtesy of Dr. Chalmers and of Dr. MacGregor I have been in constant touch with the Health Department, where a very thorough and extensive investigation of the problem has been carried on from 1918 till the present time. I have also had the advantage of regular collaboration with my colleague Dr. Marshall.

1. *The Toxic Agent.*

I cannot pretend to be conversant with the literature on this aspect of the problem, but there does not seem to be any reason to believe that the site of infection or the character of the organism have been recognized.

2. *Pathological Anatomy.*

The feature of the *post-mortem* evidence was the absence of change visible to the naked eye. This was all the more striking in view of the pronounced character of the clinical disturbance. Apart from general congestion, nothing abnormal was noted beyond isolated greyish specks in the basal nuclei and mid-brain of six patients who died in the acute stage, and a relative poverty in pigment in some of the cases which came to necropsy after prolonged Parkinsonian illness. In the spinal cord of five cases minute areas of infiltration in the posterior cornua could be seen on naked-eye examination.

This is in marked contrast with what we have observed in other cases of non-purulent encephalitis. In four cases of influenza areas of infiltration, some of them as large as a shilling, were visible on the cerebral cortex. (One of these showing naked-eye changes in each island of Reil is exhibited in the Pathological Museum.) In two cases of encephalitis due to the toxaemia of pregnancy, extensive haemorrhagic exudates could be seen with the naked eye in the basal nuclei and mid-brain. (One of these is exhibited in the Pathological Museum.) In a case of Wernicke's disease extensive haemorrhagic softening was seen in the mid-brain, and in lesser degree in the basal nuclei and cerebral cortex. Two cases of polio-encephalitis were observed in which translucent reddish areas of softening were visible in the cerebrum and mid-brain, as well as in the anterior cornua of the cord. There are on record cases of non-purulent encephalitis in which there were no naked-eye signs of disease in the brain on *post-mortem* examination, but these are generally admitted to be rare. It is thus permissible to draw the general conclusion that the encephalitis known as lethargic encephalitis differs from other forms of encephalitis in that there is, on the whole, an absence of naked-eye signs of disease in the central nervous system. No account need here be taken of the encephalitis due to syphilis, tubercle, malaria, or trypanosome infection, for these obviously belong to a quite different category.

With regard to microscopic lesions, a distinction can be drawn between the cases which died in the early stage of the disease and those which came to *post-mortem* examination after a prolonged Parkinsonian illness. In the former the lesions are diffuse, are of a moderately acute inflammatory character, and, as pointed out by Turnbull and McIntosh and Douglas McAlpine and others, tend to be more pronounced in the basal nuclei of the cerebrum and in the mid-brain; and especially in the mid-brain and in the substantia nigra of that region. Occasional foci of reaction may be noted in the cerebral cortex, pons, upper reaches of the medulla, and in the posterior cornua of the cord. The anterior cornual nuclei are not involved. The inflammatory reaction is represented in perivascular infiltration, occasional haemorrhage, deposits of salts in the vessel walls and surrounding tissues, degeneration of neurones, and occasional neuronophagia and proliferation of glial cells. The reaction is not so intense as in poliomyelitis and in influenza, and is quite different from that in Wernicke's disease or in the encephalitis of pregnancy, which is essentially haemorrhagic and not of the nature of a true inflammation.

In the Parkinsonian syndrome there is a consensus of opinion that the most pronounced lesions are in the substantia nigra. Our own findings in this respect accord fully with those of Jacob, Douglas McAlpine, and others who have gone carefully into the problem. It is questionable, however, whether the depigmentation, degeneration of neurones, demyelination, gliosis, and slight vascular change in this region are accurately interpreted as inflammation, or, in other words, as a process in which the infective agent is still active. I am not convinced that the histological appearances resemble those observed in such chronic affections of the central nervous system as syphilis, tubercle, malaria, or trypanosomiasis. On the other hand, I am in agreement with Hoffmann that in some cases there are changes, though of a minor degree, in the basal nuclei of the cerebrum. The possibility must be taken into account that the degeneration of the substantia nigra is not an isolated lesion accountable for the clinical phenomena in the sense in which anterior cornual degeneration accounts for the disabilities of poliomyelitis, or destruction of the motor cortex accounts for hemiplegia of the upper neurone variety. It is more likely that the Parkinsonian sequelae are the expression of a disordered function of the whole compendium of reflexes related to the basal nuclei of the cerebrum, the mid-brain, and the vestibular apparatus, and concerned with the regulation of those phases of automatic posture which render voluntary movement possible. Histological evidence in those cases which died in the acute stages of the disease indicates the implication of the whole series of nodal centres of correlation between the caudate nuclei and the vestibular nuclei. Such widespread involvement is presumably the basis of an original derangement of function of this extensively consolidated mechanism, and the exhaustion and degeneration of the substantia nigra may quite well be a by-product of, as well as a contributing factor to, the subversive process. Very little is known of the functional anatomy of the substantia nigra. Douglas McAlpine makes a very significant remark as to the difficulty of determining the condition of the nerve fibres which course to and from it. A solution of this problem would certainly throw much light, not only on the Parkinsonian syndrome, but on the physiology of the basal nuclei and of automatic movement.

The results of pathological investigation warrant a general

statement on the nature of the disease. The toxins of encephalitis show a predilection for the great correlating centres of the nervous system—that is, for the grey matter on the afferent side of the proprioceptive system, for certain nuclei in the base of the brain, and for the posterior cornua of the cord. It is significant that there is practically no evidence of disease in the cerebral cortex, in the red nuclei, or in the anterior cornua of the cord. In sharp contrast with this is the affinity of the toxins of influenza for the cortex and of the toxins of poliomyelitis for the anterior cornua.

3. *The Sequelae of Lethargic Encephalitis.*

The initial signs are varied. Sudden or insidious in its onset, it may be mistaken for acute mania, haemorrhage, influenza, acute abdominal disease, lumbago, disseminated sclerosis, chorea, epilepsy, and other conditions. The prevalence of an epidemic was often the most reliable clue to a diagnosis. Frequently it was only when the acute stage had passed and the characteristic sequelae appeared that it was possible to recognize the real nature of the disease. But these sequelae are characteristic and peculiarly distinct in the manner in which they appear in children, on the one hand, and in adults on the other.

In the case of children the main disorder consists of profound emotional instability with perversion of conduct. Ebullitions of excitement with uncontrollable impulse, often expressed in outrageous and criminal conduct, afford the evidence of a serious dissolution of nervous integration in the early stages of the disease. There is no clouding of perception as in epilepsy, for when the spasm has subsided there is clear recognition of what has happened, and often an expression, even a precocious expression, of regret. The presumption is that the peculiar character of the sequelae in children is determined by the fact that the disease has supervened during the early developmental period, and that neural dissolution has occurred in the basal structures before the association centres of the cerebrum have become consolidated with each other and with the lower automatic centres over which they are destined to exercise control. When, at a later stage in children, a Parkinsonian phase develops, the psychomotor excitement abates. I know of only one case out of fifty in which recovery may have occurred.

The Parkinsonian syndrome, the common sequela in adults, may emerge immediately from the acute stage or may not supervene for months or years. It comprises in its general uniformity of expression a great variety of somatic and visceral disorders, including inhibition of movement, tremor, excessive salivation, greasiness of the skin, outbreaks of sweating, abnormality in sugar metabolism, attacks of hyperpnoea, and occasionally excessive increase in weight. Combined in varying degree in the single characteristic sequela are the features of two distinct diseases—of paralysis agitans and of katatonia. It is a paralysis agitans with vegetative disorder, and it is a katatonia without the stupor. It is inconceivable that such a varied disorder should be due to a lesion confined to the substantia nigra in the sense in which infantile paralysis is due to destruction of the anterior cornua, or hemiplegia to ablation of the motor cortex.

I have pointed out elsewhere that the initial involvement of the ocular and vestibular apparatus is consistent with the presence of acute changes in the basal nuclei and brain stem. The parts of the central nervous system originally affected are essentially those whose integration is concerned in the postural and automatic movement necessary for voluntary control by cortical activity. This great compendium of reflexes has its nodes of integration in the basal nuclei of the cerebrum, in the mid-brain, in the vestibular nuclei, and in the posterior cornua of the cord. It is known to physiologists as the proprioceptive system, and it is suggested that the Parkinsonian sequela is due to a functional derangement of this system incident to destruction of some of its vital parts in the early stages of encephalitis. This conception is consistent with the anatomical findings on which a comparison was made with poliomyelitis and influenzal encephalitis. The lesion in poliomyelitis is in the anterior cornua, in influenza in the cerebral cortex, and in lethargic encephalitis in the correlating centres in the basal nuclei and posterior cornua.

The manner in which a great neuro-muscular compendium may be functionally deranged is seen to advantage in the case of the respiratory mechanism, in which normal health may be impeded by the pathological reactions of coughing, sneezing, hiccup, or the closely allied phenomenon of vomiting. Pathological physiology has to do, not merely with absence, diminution, or increase of normal function; it deals with the aberrant irradiation of stimuli and with subversive reactions which are absolutely inconsistent with normal function, but which may be kept within limits by stabilized organic tendencies. The pathological physiology of the Parkinsonian syndrome is the study of an organized chaos, a chaos induced in the first instance by destruction of important integrations and reorganized on an unstable basis in the process of rehabilitation. A suggestive analogy may be found in cardiac disease, in which the circulatory failure, which is often long delayed, bears some resemblance to the Parkinsonian syndrome. The adaptive process is not confined to the heart itself. It extends to the peripheral circulation in which altered tonus plays a part. When the subversive element in the adaptation gains the ascendancy the failure due to oedema and waterlogging occurs in the peripheral circulation. It is not unlikely that the progressive disability in the Parkinsonian syndrome is due, not to the continued activity of the original toxin, but to aberrant irradiation and subversive tendencies in a poorly adapted proprioceptive system. This conception is supported by the remedial effect in some cases of intensive treatment with belladonna and hyoscine.

The outlook in this sequela is no more favourable than that in the special disorder in children, although great improvement may occur and progress may be stayed in many cases by the treatment mentioned.

Of those who survive the acute stage few make a recovery. Not more than sixty, out of three hundred, were free from all signs and symptoms two years after the infection. It is a remarkable fact that in a disease involving vital centres of the brain and producing such pronounced aberrations of conduct and impediments to behaviour, there should be practically nothing in the nature of dementia in the sense in which that term is understood by the alienist.

4. *History of the Disease in Glasgow.*

Looking back on the history of the disease in Glasgow several points of interest arise. Profound lethargy marked the earliest cases in 1918. The first six cases I saw never came out of the state. In 1919 the initial symptoms were often those of acute excitement. In 1920 (as, to a lesser degree, in 1924) a large proportion of those affected were children, and the majority of these showed choreiform agitation. In 1921 and 1922 the majority affected were adolescents and adults, and the initial symptoms were again severe, although in some cases they were insidious and took the form of transient giddiness or diplopia. In a few cases the disease began with epileptic seizures. In 1923 and 1924 the onset was, as a rule, more gradual; and we now know from the sequelae which have developed in the interval that the infection may occur without producing any inconvenience that could reasonably be ascribed at the time to encephalitis. In 1924 some cases were so misleading as to determine a definite diagnosis of disseminated sclerosis. In one instance Dr. Marshall and I demonstrated on several occasions, as a typical example of disseminated sclerosis (ankle clonus, positive Babinski, absence of abdominal reflexes, nystagmus), a case which afterwards became lethargic, and which, on *post-mortem* examination, revealed the definite evidence of encephalitis in the basal nuclei and in the posterior cornua. There was no histological evidence of disseminated sclerosis. I have four *post-mortem* records of similar cases. It is important to note that the optic nerves were normal in each case. There has been no epidemic since 1924, and in the interval I have not seen a single acute case in which the diagnosis of lethargic encephalitis was unequivocal.

II.—THE PATHOLOGY OF EPIDEMIC ENCEPHALITIS.

BY

J. GODWIN GREENFIELD, M.D., F.R.C.P.

1. *Etiology: the Virus of the Disease.*

EPIDEMIC encephalitis resembles many of the common infectious diseases in being caused by a virus which no one has seen, or has been able to grow in an artificial medium. Whether it has been possible even to transmit the disease to animals is still a matter of dispute, although the most recent work tends to confirm rather than to discredit the assertions of those who claim to have done so. This work is of the very greatest interest, and it is of special importance in that it seems to clarify some of the difficult clinical problems which the disease presents. In particular, it seems to shed light on the question why the more acute forms of the disease are less often followed by progressive sequelae than those in which it begins more insidiously.

Those who have claimed to infect animals with the disease must be divided into two groups. The protagonists of the first group are Loewy and Strauss of New York, and Kling and his associates in Sweden. Certain of those who obtained the earliest positive results in this country must also be included in this group. These workers used either brain pulp, or cerebro-spinal fluid, blood, nasopharyngeal secretion, urine, or faeces from cases of encephalitis for injections into rabbits. The animals showed no symptoms, but when they were killed and their brains examined microscopically about 50 per cent. were found to show lesions very similar to those of the human disease; in particular, foci of lymphocytic exudate and perivascular infiltration. This disease could be transmitted from rabbit to rabbit indefinitely, but again only about half of the rabbits became infected. The claims of these workers were shown to be invalid by McCartney, who examined 372 stock rabbits at the Rockefeller Institute, and found similar lesions in the brains of 55 per cent. Following on the work of Bull and Oliver he was able to trace the etiology of the encephalitis in these animals to a protozoon which Levaditi has named the *Encephalitozoon cuniculi*. This comparatively harmless parasite had obviously caused an epizootic among the experimental animals, which chanced to resemble encephalitis lethargica in its histological characters. These results must therefore be completely discounted.

The other group of workers who have transmitted encephalitis to animals claim that the etiological agent is identical with that of herpes febrilis, differing from it only in possessing a greater affinity for the nervous system. The first to transmit this virus from the human disease were Levaditi and Harvier, who in 1920 produced the symptoms of acute encephalitis in a rabbit by the subdural injection of brain tissue obtained from a case of encephalitis lethargica. It is noteworthy that the patient from whom this material was taken had facial herpes at the time of death. Following on this, Doerr, Schnabel, and Berger in Basle, Luger and Lauder in Vienna, and Perdrau in London, have produced encephalitis in rabbits by the inoculation of either brain pulp or cerebro-spinal fluid. All these workers state that it is extremely difficult to infect animals, and that only a very few of the human cases of encephalitis examined yield a virus which is pathogenic for animals. But when encephalitis is produced in the rabbit, it can usually be transmitted as a rapidly fatal disease from animal to animal.

It has been known, since the pioneer work of Grüter and its confirmation by Kraupa and Löwenstein, that fluid obtained from the vesicles of dendritic ulcers, or of labial herpes, contains a virus which, when inoculated on to the scarified cornea of rabbits, produces a keratitis, accompanied by sero-purulent conjunctivitis and often followed by rapidly fatal encephalitis. Levaditi and Harvier, in ignorance of this work, inoculated the virus which they had obtained first into the anterior chamber of the eye, and later on to the scarified cornea of rabbits, and in both instances produced not only local lesions, but an encephalitis from which the animals died in ten to fourteen days after inoculation. It only remained for Blanc, working in the Pasteur Institute at Athens, to compare the virus obtained from these two different sources, and to prove by crossed immunity experiments that they were identical. It is true that certain differences are noticeable, not only between encephalitis and herpetic virus, but also between different strains of encephalitic virus. Some of the latter constantly cause both keratitis and encephalitis, others produce a less severe keratitis, but when injected into the brain produce a fulminating encephalitis. On the whole, the herpetic virus is more virulent for the cornea, and less virulent for the brain, whereas the encephalitic virus may be comparatively avirulent for the cornea. But when keratitis has been produced by a virus of either kind, it is impossible to reinfect that cornea with virus of any other strain, although it still remains sensitive to inoculation by other viruses, such as that of vaccinia.

The only serious criticism brought against the theory of the identity of the virus of herpes febrilis with that of encephalitis lethargica is that in the few instances in which encephalitis has been caused in rabbits by the inoculation of human material the virus of herpes febrilis had been accidentally included. This may well have been so in Levaditi's first case, in which herpetic vesicles were present at death. In fact, Flexner obtained an apparently identical virus from the cerebro-spinal fluid of a convalescent case of neurosyphilis. Herpes is a very common and widespread disease among mankind, and the fluid from herpetic vesicles is constantly pathogenic to rabbits. Not only so, but saliva and nasopharyngeal washings of those who are susceptible to herpes are frequently sources of herpetic virus. It would, therefore, not be surprising if occasionally virus of this kind reached the cerebro-spinal fluid during life, or the brain after death. This opinion is strengthened by the observations of Teissier, Marinesco, and others, that patients suffering from encephalitis lethargica are not more but less immune to herpes inoculated cutaneously than are the generality of mankind. Levaditi himself thought to cure encephalitis lethargica by injecting the virus of herpetic encephalitis into the lumbar canal of patients, and produced in many of them facial or labial herpes. There is therefore no such crossed immunity in the human subject as exists in rabbits. But it is notorious that human immunity to herpes febrilis is very slight. Even in the rabbit immunity to herpes does not last long and shows many peculiarities. It is definitely a tissue immunity and not a humoral immunity. Mixing the serum of an immune rabbit with virus does not reduce its virulence, although the addition of immune brain pulp sometimes does so.

Perdrau found that the brain pulp of rabbits immunized by cutaneous inoculation contained aggressins in addition to immune bodies, and that when kept in glycerin from two to three weeks the aggressin remained active, whereas the immune bodies deteriorated. Acting on these observations, he fortified the virus contained in human brain emulsion by adding to it before inoculation twice as much brain pulp from a recently immunized rabbit. In this way he produced encephalitis in rabbits with material which, when injected alone, proved ineffective. He also made use of the "negative phase" of immunity by performing his intracerebral injection the day after a dermal inoculation, or even by giving on four successive days two dermal and two intracerebral inoculations. In this way he was able to produce encephalitis in rabbits with material from each of three fatal cases of encephalitis lethargica. His work is of the utmost importance, since it seems to indicate why so many of the earlier experiments had failed. He showed in the first place that the most virulent human virus, which, if preserved in glycerin long enough to rid it of the accompanying immune bodies, produced in rabbits a fulminating encephalitis, fatal in four days from the time of inoculation, might, if injected fresh and without the help of aggressins, produce no symptoms at all. And secondly, that less virulent material, especially that obtained from less acute cases of the disease, might produce in rabbits a subacute form of encephalitis with lethargic symptoms. These symptoms were quite unlike those of the ordinary herpetic encephalitis, but were exactly

similar to those seen if herpes virus were inoculated intracerebrally into immunized animals at a time when their immunity was passing off. In both cases the brains of these animals did not yield any virus which could be transmitted to other animals. From these observations he concluded that in the human disease one of three things may happen:

"(1) The development of a local cellular immunity which overcomes the infective agent and leads to a complete recovery. (2) The development of a state of cellular immunity which only partially overcomes the infection, the final issue being either a fatal one or a chronic infection. (3) Failure of the development of any immunity and a quickly fatal result."

Cases of type (3) would yield a virus which, being free from immune bodies, would be easily transmissible to rabbits; but the majority of cases were of type (2), and material from them would be either completely non-infective or might produce a subacute encephalitis from which no further active virus could be obtained. If, however, it were freed from immune bodies by prolonged glycerination, or if its virulence were increased by the addition of "aggressins," such material might produce a typical herpetic encephalitis transmissible to other rabbits. Now the experimental work with herpes has shown that the immunity obtained by the inoculation of a weak virus is less complete and more evanescent that that given by a strong virus. It seems, therefore, likely that in the human subject an infection by a comparatively non-virulent strain might fail to produce sufficient cellular immunity to kill off the virus completely, and that it might spread in the brain, attacking only those cells which have less power of resistance. It may be, as Perdrau has suggested, that certain cell groups are less resistant than others, and possibly the melanin-bearing cells of the substantia nigra and substantia ferruginea are particularly susceptible. If so, it is easily understood why cases in which the initial cerebral symptoms are of the slightest character frequently go on progressively to a state of post-encephalitic Parkinsonism.

2. *Clinical Pathology: the Cerebro-spinal Fluid.*

The only laboratory examination which gives any assistance in arriving at the clinical diagnosis is that of the cerebro-spinal fluid. Here the evidence is sometimes negative rather than positive, as, even in the early stages, the fluid may be quite normal or may contain a slight excess of glucose, which is always of doubtful significance. But usually in the first few weeks of the disease there is a lymphocytosis of 10 to 100 or even more cells per cubic millimetre. In my experience, as well as in that of others, the cells are usually all mononuclear, but occasionally the presence of a varying proportion of polymorphonuclear cells has been reported. In the past I have been inclined to doubt the diagnosis when any considerable proportion of the cells were polymorphonuclear. But in one case in which I found 10 per cent. polymorphonuclear cells, the onset of typical sequelae has established the diagnosis; and there appears to be no reason for doubt in Douglas's Sheffield cases, where as high a proportion as 44 per cent. was sometimes found. In a case examined histologically by Da Fano, as also in one of von Wiesner's, the inflammatory exudate in the brain was largely polymorphonuclear in character, and this is the case also in the herpetic encephalitis of rabbits during the more acute stages. In view of these facts I am inclined to alter my earlier opinion, and to agree that polymorphonuclear cells may sometimes occur in the cerebro-spinal fluid. It is characteristic of encephalitis that the rise in the cell count is not usually associated with any great increase either in the total protein or the globulin, and sometimes a large cellular excess is associated with a normal protein percentage—the so-called cell-protein dissociation. Excess of protein is exceptional, and a coagulum practically never forms. Yellow or haemorrhagic fluids are sometimes obtained when there has been meningeal haemorrhage, but such cases appear to be rarer now than they used to be. Not uncommonly, the colloidal gold reaction gives curves of the luetic type. Some workers have obtained such reactions in every case examined, others only in 15 to 50 per cent. of cases, but all are agreed that some change in the colloidal gold is characteristic of the disease. Occasionally fairly strong curves of the paretic type have been obtained, but these are much rarer. The colloidal gold reaction is of special importance in the post-encephalitic states, as it may give the only evidence of any abnormality in the fluid. The reactions obtained at this stage are usually so weak that the other colloidal reactions may fail to demonstrate them.

3. *Morbid Histology.*

The histological picture of the disease is so well known that it would be unnecessary to add anything to it, were it not that there has lately been a tendency to focus attention on the mid-brain, forgetting the cerebral cortex, and to think more of the cellular exudate than of the damage done to the neurons. It has now been definitely established that post-encephalitic Parkinsonism is due to the destruction of the cells of the substantia nigra, and certain evidence, both clinical and pathological, appears to justify the assumption that sometimes the disease lingers on in this region of the brain after it has died out elsewhere. But there can be no doubt that destruction both of these melanin-containing cells and of nerve cells elsewhere in the brain may, and does in fact, take place at a very early stage. I have examined the brain of a case of lethargic encephalitis which terminated on the twenty-third day of the disease in which most of the cells of the substantia nigra had already disappeared.

Now it is easy by any of the ordinary staining methods to establish the disappearance of melanin-bearing cells, as the granules of melanin lie about free in the tissues for some time afterwards. But it is very much more difficult to tell when there has been destruction of some of the cells of the cortex or of the basal ganglia. In the case of the latter organs, cell counts have occasionally been done, and have shown that a certain small proportion of the neurons have disappeared. General shrinkage of the basal ganglia has rarely been taken into account, although it is well known that this may occur and may confuse the cell count. In the cortex comparative cell counts are extremely difficult. But decay of the neurons of the cortex and basal ganglia may be demonstrated in a large number of cases by the collection of lipoid granules around the walls of the small vessels in those regions. The majority of these granules appear to consist of the lipochrome of nerve cells, although a certain number may result from the destruction of myelin. Compound granular corpuscles, however, are very rarely seen, and demyelination of the cortical layers is never prominent. There is evidence that lipochrome is not easily metabolized in the tissues, and its appearance in large amounts in the walls of the small cortical vessels after a few weeks of disease may, I think, be taken as showing at least severe damage to, if not destruction of, a large number of cortical neurons.

I have recently examined the brain of a case of encephalitis which ended in mania about four weeks after the onset of diplopia and parasthesiae. In all the regions of the cortex examined the accumulation of lipoid, not only in the nerve cells but also around the walls of the vessels, was very striking. It was not everywhere of equal intensity, but was usually greatest at the bottom of the sulci, and from here spread outwards in an irregular fashion towards the surface of the brain. Similar collections of lipoid pigment were also present in the putamen and caudate nucleus, but were less noticeable in the pallidum and optic thalamus. Unfortunately I did not have an opportunity of examining the mid-brain in this case. In a post-encephalitic case in which, in addition to Parkinsonian bradykinesia, there was pronounced lethargy, similar perivascular collections were found in the cortex, especially in the occipital poles. In the frontal cortex there was, in addition, a definite disappearance of nerve cells.

We are therefore justified in considering encephalitis lethargica as a disease in which there may be widespread and severe destruction of nerve cells, not only in the brain stem, but also in the cortex; and it seems clear that this neuronal degeneration is quite independent of any inflammatory cellular reaction that may be present. It is of interest to note that such skilled observers as Bouman and Bok and Flexner and Amoss have demonstrated a similar direct action by the virus on the nerve cells in the herpetic encephalitis of rabbits. This conception of

the pathogenesis of the disease is supported by the observations of McNalty, Boyd, and others, that in the most rapidly fatal cases there may be little or no inflammatory exudate or perivascular cuffing. It is not a new conception, but it is perhaps a useful one to keep in mind when we try to visualize the pathological substratum of the mental sequelae of lethargic encephalitis.

III.—CHRONIC ENCEPHALITIS.

BY

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CLINICAL and pathological experience has shown that encephalitis lethargica, like neuro-syphilis and disseminated sclerosis, is essentially a chronic disease. For whether it declares itself acutely or insidiously, and however complete the recovery from the initial phase may appear to be, in a large proportion of cases the infection, which has evidently lain dormant for weeks, months, or years, again becomes active and gives rise to the grave disabilities with which we are familiar. The distressing result is that we never know when the patient is cured. At present we are at a prognostic impasse.

The disease commonly begins as an acute illness, with the symptoms and signs of which we are not here concerned. Suffice it to say that it may be severe, with high fever and general constitutional disturbance; or subacute, with or without distinctive features, such as lethargy and diplopia; or so slight that it is looked upon as a trivial event. The mortality rate has been differently estimated, but it probably lies between 20 and 30 per cent. Of the survivors, some are left with residual troubles, that may in time disappear, or become stationary, or get worse. Others remain well for so long that we hope that the cure is complete. But there is always the danger of relapse and the development of late manifestations.

An important group of cases is that in which the disease seems to be chronic from the beginning. Of course there is the possibility that the initial attack has been missed, or passed over as either influenza or a common cold. But with that in mind cases are not infrequently met with in which the most searching inquiries fail to reveal the history of a suspicious illness.

Clinical Forms of the Disease.

Although the virus of encephalitis lethargica has a predilection for the brain stem and corpus striatum, no part of the nervous system is immune. It has to be remembered also that the disease is a general infection with a special affinity for the neuraxis, but with powers to attack other structures as well, notably the ductless glands. The variability of its clinical manifestations is, therefore, not surprising. At the same time there is the danger, when dealing with a new disease about which our knowledge is far from complete, of overstressing its polymorphism and of using it as a harbour for our diagnostic difficulties. The clinician with his mind attuned to new possibilities requires the constant check of pathological investigation. Nevertheless, chronic encephalitis lethargica is already stamped by the occurrence of many distinctive disorders of function, and others, doubtless, will yet come to light.

It is useful to separate various clinical pictures or syndromes from the diverse manifestations of the disease. With a widespread infection of this sort a classification on rigid anatomical or physiological lines is impracticable. More convenient, if less scientific, is one that is based on common groupings of symptoms and signs which more or less indicate the main anatomical incidence of the lesion, although different physiological units may be involved. But here again the liability to recurrences may so alter the clinical picture throughout the course of the complaint that classification on any basis becomes complicated and inadequate.

In the time at my disposal I will not attempt more than a brief outline of some of the physical disorders of function presented by the disease in its late stages. The mental changes, which are so important, especially in children, are dealt with by Dr. Marshall.

The Parkinsonian Syndrome.

This is the most common disability of a general kind in adults resulting from encephalitis lethargica. It occurred, for example, in 70 out of 129 cases studied by Mme Lévy.[5] It may appear rapidly during the acute illness when there is some hope of improvement. But more often its evolution is slow and progressive from the outset, although in its course there may be stationary periods.

The clinical picture of the disorder in its fully developed form is now so familiar that to describe it afresh would be unnecessary. It would be more profitable to consider some of the features which indicate the mild Parkinsonian state. These are often slight, but, as a rule, so alter the patient's appearance and behaviour that they at once arrest attention. He too is always aware that something is wrong, and his constant complaint is of a sense of weariness and reduction in vigour. These symptoms will be discussed later in more detail, since they may be present in extreme form without gross physical signs. With them, but not invariably, there is lethargy or insomnia, which may last continuously for many months, or disappear for a time and recur. The sleeplessness is particularly resistant to treatment. Such disorders of sleep are, of course, not peculiar to the Parkinsonian state, but may form part of any of the clinical pictures of chronic encephalitis lethargica.

The early signs of Parkinsonism are found more in the upper part of the body, especially the face, than elsewhere. The face is greasy, the expression tends to be fixed, the eyes staring, the mouth often a little open, and a pool of saliva may be seen between the lower lip and the teeth. The palpebral fissures may be wide or narrow, but blinking is infrequent, and quivering of the lids, when an attempt is made to open or shut the eyes, is a constant sign. Diplopia, squint, and nystagmus are less commonly found than in the acute stage of the disease, but defects in ocular movement or pupillary reaction are never absent. The external ocular palsies are supranuclear in origin, and consist of defective conjugate movement, especially on convergence. A striking abnormality that is sometimes observed is intermittent spasm of the elevators of the eyes. The pupils are not usually altered in size or shape, but are often unequal, and almost always show some disturbance of reflex action to light or of accommodation, or both. They may be fixed. Impairment of the pupillary accommodation reflex and of conjugate convergence of the eyes go together. Although there may be no definite diplopia, mistiness of vision from defective muscle balance or ciliary paralysis is often complained of, and may be a persistent defect.

A characteristic feature of the Parkinsonian state is the relative immobility of the affected parts even in the apparent absence of rigidity, at all events to the ordinary clinical tests. In its minimal development this is evident in slight fixity of the facial expression and of the eyes, a tendency to hold the head still, a reduction of the associated swinging movement of the arm in walking, and a diminution in the natural fidgetiness of the healthy individual.

Along with the face, one upper limb is usually slightly affected in the mild cases of Parkinsonism, and when there is any rigidity its cog-wheel character can best be detected at the wrist. Of the other slight signs of the Parkinsonian syndrome two only will be mentioned—namely, excess of saliva in the mouth, the result of diminished activity of the swallowing reflex, and micrographia. Even slight involvement of the right hand is apt to be portrayed in the handwriting, which becomes smaller, the reduction in size of the letters being progressively evident towards the end of each line, and even more as the script goes on. In addition, the lines forming the letters are slightly wavy, although tremor of the hand may not be seen.

Involuntary Movements.

Involuntary movements of many different kinds are amongst the common manifestations of chronic encephalitis

lethargica. The time of their appearance in relation to the onset of the disease, their duration, and the constancy of any one form show great variation. More than one variety may be seen in the same patient, and they may change during the course of the illness. Some are slight and almost insignificant, others are large and arresting, and, in a severe case, the body may be in an almost constant riot of movement.

Involuntary movements rarely, if ever, occur alone as the sole manifestations of the disease. Mental or physical derangements of some sort are also present, but may be so slight as to be easily missed by the casual observer. Emotional instability and restlessness, especially at night, lapses in behaviour, minor pyramidal or extrapyramidal signs, and oculomotor defects are perhaps the most frequent slighter accompaniments of involuntary movements, but any of the dramatic respiratory disorders may be found.

Mme Lévy[5] has grouped the involuntary movements of encephalitis lethargica as follows: (1) choreiform movements, (2) bradykinesia, (3) myoclonic movements, and (4) tremors. But, in addition, there are many others—for example, innumerable tics, shuffling and stamping movements of the feet, ocular or glossal spasm, complex automatic actions of the whole body, and the "imitative" movements described by Babinski and Klebs.[1] Brief mention only will be made of some of these abnormal reactions.

Bradykinesia is the term used by Marie to denote slow, regular, rhythmic movements, often of great amplitude. Such are torsion of the trunk, athetoid movements of the limbs, spasmodic torticollis, and grimacing. They are not often encountered.

Myoclonic movements are well known in the acute phases of the disease. But they may also appear as late manifestations in any part of the body and persist for months, accompanied by pain and cutaneous tenderness, radicular in distribution. The pain is often severe and persistent, and may continue long after the shock-like muscular contractions have gone. The contractions are rhythmical, at a rate which varies but may reach forty a minute, and involve part of a muscle, a whole muscle, or a muscle group. Usually they are of insufficient strength to displace a limb segment. When they are localized, the upper abdominal wall or the diaphragm is most often the part affected, and in the latter case the objective manifestation of the contractions is recurrent hiccup.

Tremor of different parts of the body occurs chiefly as a complication of the Parkinsonian syndrome. Froment and Delore[4] have rightly insisted that, unlike the tremor of paralysis agitans, it occurs as a rule only during voluntary movement or the maintenance of an active posture. In addition to the limbs it is found elsewhere, giving rise, for example, to shaking of the head, clicking of the teeth, to-and-fro movements of the tongue, and a rhythmical sucking action of the lips.

All involuntary movements are aggravated by emotional disturbance and fatigue, and, so far as I know, disappear during sleep.

Respiratory Disorders.

A considerable literature has grown up concerning these striking and diverse abnormalities. At first they were often looked upon as hysterical, a not surprising mistake, for they can to some extent be controlled by voluntary effort, become aggravated by excitement, and are frequently associated with emotional instability and restlessness, especially at night. With some of the more severe respiratory disorders, delusions and violence may develop, necessitating the patient's confinement in a mental hospital.

Turner and Critchley[6] have classified respiratory abnormalities into three groups: disorders of rate, disorders of rhythm, and respiratory tics.

Tachypnoea and bradypnoea are usually paroxysmal, the attacks varying in duration from a few minutes to several hours. With increase in the respiratory rate (60 to 100 a minute) breathing as a rule is shallow, not necessarily distressing, and there may be no accompanying tachycardia. Sometimes, however, breathing is deep as well as rapid, and, in prolonged attacks, tetany from overventilation of the lungs may then develop. Tachypnoea is followed by a period of either bradypnoea or apnoea before normal respiration is established. In bradypnoea the respiratory rate may fall as low as 6 per minute and the breathing is deep and often noisy and panting.

The term "dysrhythmia" is used to cover such abnormalities as sighing, apnoeic pauses, breath-holding, and the like. Breath-holding is a most dramatic performance, which may be often repeated, especially towards evening, and occur during sleep (Turner and Critchley[6]). After a few deep breaths the chest is held in full inspiration for as long as half a minute. The head is often thrown back, the limbs may perform various grotesque movements, the face may or may not be cyanosed, and, in the longer attacks, consciousness is sometimes lost for a short time. Noisy expiration follows and normal breathing is then established.

Respiratory Tics.—Hiccup, yawning, spasmodic hard cough without expectoration, sniffling, hawking, sneezing are all included under this heading. They are perhaps most often met with in young patients of school age, who, in addition, show changes in character and are subject to nocturnal excitement.

Spastic Paralysis and Muscular Atrophies.

Evidence of slight pyramidal disturbance is common enough as part of almost any of the syndromes of chronic encephalitis lethargica, especially Parkinsonism; and, since Buzzard and Greenfield[2] described the first case, it has been recognized that hemiplegia, with or without an apoplectiform onset, can occur during an acute attack of the disease. So, also, rapidly developing paraplegia from myelitis has not been unknown in some of the epidemics. But paralysis of either cerebral or spinal origin may also develop insidiously and form the prominent part of the clinical picture. The diagnosis in such cases may be extremely difficult or remain uncertain, but, as a rule, distinctive phenomena are associated with the paralysis, or the history of the illness provides the clue. Thus, Wimmer[7] has described a case of hemiplegia in which the paralysis was gradually replaced by Parkinsonian features. These disorders may occur simultaneously and on different sides of the body, as in one patient I had under observation for several weeks. Another case, where, however, the diagnosis is more doubtful, is that of a man of 53 who, three years after an acute attack of encephalitis lethargica, developed progressive paresis of one lower limb along with nystagmus and unilateral deafness. He was otherwise healthy.

Local muscular atrophies, with or without fibrillation, in different situations have been described by several observers. Thus, Wimmer[7] has recorded an example of wasting of the tongue, and I have at present under my care a patient with unilateral glossal atrophy with fibrillation. Sicard and Paraf, Froment, and others have described amyotrophies in the limbs. These are often associated with pyramidal or sensory disorders, clearly pointing to spinal involvement. From histological and clinical evidence it would appear that muscular atrophies may be due to lesions either of the anterior horns or the roots, and, when radicular, there are often in addition severe root pains and cutaneous tenderness which may persist for months.

Endocrine Disorders.

Adiposity, with or without disturbance of the sexual functions, is fairly frequently met with. Duncan[3] found it in 7 out of 83 cases investigated at the London Hospital. One of my patients, a young girl, who became rapidly and grossly fat after an acute attack of the disease, had amenorrhoea lasting for many months. Later she developed exophthalmic goitre, and her weight diminished, but did not fall to normal until she made an apparently complete recovery in eighteen months.

In another case tachycardia, tremor, slight goitre, and emotional instability appeared in a girl a few weeks after she had seemed to recover from the acute phase of her illness, and persisted for many months.

Diabetes insipidus and glycosuria are also occasional late results of the disease.

[1] Babi
[2] Buzz
[3] Dun
[4] Fro
[5] Lévy
Ga
[6] Turi
[7] Wim

Asthenic Syndrome.

Lastly, there is a clinical picture of chronic encephalitis lethargica of which enfeeblement is the constant and main symptom, and in which the physical signs may be slight. Insufficient attention has been paid to this not uncommon syndrome.

The condition may follow an acute attack of the disease, either immediately or after a variable interval, or develop as a chronic state from the beginning. The patient's complaint is of a more or less persistent sense of fatigue, both mental and physical, not as a rule a mere inertia, but associated with the discomfort of great weariness. There is diminished desire or power for effort, and physical exertion or mental exercise aggravates the sensation of weakness. The patient looks tired and lackadaisical, and his movements and speech are slow and without animation. For a considerable time he may, with difficulty, continue his work, but if the feebleness increases, as it usually does, he ultimately gives up the struggle and lies in bed or sits in a chair doing nothing. Unlike the weakness of myasthenia gravis, the feebleness is not as a rule much diminished by rest, and, unlike the neurasthenic, the patient does not tend to feel better as the day goes on. He may sleep well or be lethargic, but quite often insomnia is a serious complication.

Especially when there are family responsibilities, the results of worry cloud the clinical picture, and depression, tearfulness, and irritability lead to the common diagnostic error of anxiety neurosis.

This state of fatigue with the sense of general ill health and weariness is common to most, if not all, Parkinsonians; but the point I wish to stress is that it quite frequently occurs as the sole or main disability. At the same time, in my experience, some of the patients who are afflicted in this way sooner or later develop the Parkinsonian syndrome, but with what frequency I cannot say, since the period of observation in many is as yet too short. In one case, a man of 40, the characteristic facies and bodily posture began to develop fifteen months after the onset of the illness.

Slight physical signs are almost always found, and of these defective pupillary reactions and conjugate movements of the eyes, especially on convergence, are the most frequent. Sometimes there is a little weakness of voluntary movement of the face, tongue, and palate; or again mild Parkinsonian signs or involuntary movements, such as tremor or facial tic, may be seen.

Recognition of this group of cases is important, not only from the point of the symptomatology of the disease as a whole, but also for the differentiation of these cases from patients suffering from psychogenic disorders, with which they are frequently confounded.

In the literature occasional reference has been made to this clinical form of encephalitis lethargica as a "myasthenic" variety of the disease—a term which, in my opinion, should not be used; for between it and myasthenia gravis there are many essential clinical distinctions and complete pathological divergence.

The gaps in this brief outline of the clinical features of chronic encephalitis lethargica will be filled in by subsequent speakers. Our knowledge of the symptomatology of the disease, if yet imperfect, is steadily growing, but it must be admitted that in regard to prognosis and treatment we are at present profoundly ignorant. With nine years' experience now behind us, and a wealth of material at our disposal, much could be done by systematic investigation, especially at large hospitals, to throw more light on the outcome of the disease and its various manifestations.

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IV.—MENTAL ASPECTS OF EPIDEMIC ENCEPHALITIS.

BY

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THE disease encephalitis lethargica may be defined as an infection the toxic products of which have an affinity for the grey matter of the central nervous system, and so give rise to any of the syndromes of disease of that tissue or to any combination of such syndromes, and which runs a fickle course that may end in recovery, death, or the production of characteristic sequelae.

In seeking to make a helpful contribution to a discussion of this protean disease it seems best not to try to give an epitome of the disease, but to choose certain topics suitable for discussion. It is proposed, therefore, in what follows to deal briefly with the following points:

1. The clinical importance of the course that the disease runs.
2. The incidence of the characteristic sequelae of the disease.
3. The mental state of the restless, naughty child.
4. The clinical affinities of the Parkinsonian syndrome.

1. *The Clinical Importance of the Course that Encephalitis runs.*

The chief end of the clinician's work on this disease appears to be to cut out of its protean manifestations various types, and to arrange them in a scheme of classification. Little or no success, however, has attended his efforts in this direction. Of the many schemes of classification of the clinical varieties of epidemic encephalitis that have been drawn up in almost every European tongue, no one has met, or is likely to meet, with general acceptation. This general failure to make good in their taxonomic labours has been attributed by the clinicians themselves to the way in which well defined types of nervous disorder succeed each other in the course of the disease. It is not uncommon, they have pointed out, to see epidemic encephalitis begin as a neuralgia, and then pass through a series of states akin to chorea, lethargy, and acute mental confusion, each succeeding state blending with its neighbours in a way that eludes their powers of definition. But this failure to define clear-cut types of the disease is hardly a matter for regret, for while the fickle course that the disease runs may render the work of the taxonomist impossible, it is in itself a most valuable subject of clinical study. In this respect its chief value lies in the fact that a study of the course that the disease runs clinically brings the observer into touch with the morbid process responsible for the production of the clinical types that are the taxonomist's preoccupation. In so far as the clinical varieties that the taxonomist defines are static, there is nothing specific about them. There is nothing specific, for example, about the ophthalmoplegia of epidemic encephalitis, even although paralysis of accommodation is commonly met with in that condition. It only regains its specific character when it is reviewed in the light of its clinical history, and demonstrated to be an incident in the course of a disease that runs a kaleidoscopic course.

While an epidemic of encephalitis lethargica is raging, the diagnosis in the great majority of cases offers no real difficulty. It is another matter, however, when it is a question of recognizing a sporadic case of the disease. In these circumstances the difficulties of a differential diagnosis between epidemic encephalitis and the other forms of non-purulent encephalitis may be insurmountable. The same remark applies to the difficulties that arise on meeting an unusual form of chorea, ophthalmoplegia, or lethargy. In all these instances, however, the fact that the condition has occurred in the progress of a malady that has run a fickle course, in which divers symptoms of nervous disease have put in an evanescent appearance, goes a long way to establish the nature of the disease process at work.

2. *The Incidence of the Sequelae in Encephalitis Lethargica.*

It is usual for an interval to elapse between the subsidence of a disease and the appearance of its sequelae. This is far from being the rule, however, in epidemic encephalitis. Not infrequently it happens that a syndrome that has played a more or less prominent part in the acute phase of the disease persists after this phase has apparently subsided. Tics, disorders of the respiratory rhythm, and psychomotor excitement frequently behave in this way. Although it is usual for an interval of anything up to four years to elapse before the appearance of the Parkinsonian syndrome, it also may follow hard upon, if not actually arise out of, the acute phase of the disease. On the strength of these considerations the appropriateness of the term "sequelae" for such manifestations of epidemic encephalitis has been called in question, and the term "residua" used in place of it. But the facts of the case are not so unique as to warrant this change in terminology. Scarlatinal nephritis is commonly regarded as a sequela of scarlet fever because an interval of a fortnight elapses between the subsidence of the fever and the appearance of the nephritis. But nephritis may also appear as a symptom of scarlet fever, and persist after the fever has subsided; yet no one has ever suggested on that account that scarlatinal nephritis should not be spoken of as a sequela of scarlet fever. The term "residua" may play quite a useful role as a label for the nervous syndromes that arise out of the acute phase of epidemic encephalitis and follow a subacute or chronic course of their own, but it can never displace the term "sequelae" for those syndromes which appear some time after the subsidence of the acute phase of the disease.

Age appears to play an important part in the incidence of the residua and sequelae of epidemic encephalitis. Psychomotor excitement, with or without nocturnal wakefulness and somnolence by day, tics, choreiform movements, and disorders of the respiratory rhythm, show a preference for the early years of life. On the other hand, the Parkinsonian syndrome, the well defined states of mental disorder—mania, melancholia, and confusion—and the residual paralyses are the appanages of youth and adult life.

Sex does not appear to influence the incidence of the sequelae; but there is some evidence to show that, although pregnancy does not play the part it was at one time thought to play in modifying the course of epidemic encephalitis in women, it influences the incidence of the Parkinsonian syndrome.

An attempt has been made to show that the severity of the acute attack influences the incidence of the sequelae. This is largely the work of observers who have been in a position to follow the after-history of patients whom they have treated during the acute phase. It is, however, a very common experience in a neurological clinic, or in a mental clinic for school children, to be unable to get a history of an acute attack of the disease in patients who show the sequelae of the disease in their most characteristic forms. This fact has led many observers to connect the incidence of the sequelae with the way in which the acute illness and the convalescence have been managed. These observers hold that the great desideratum is rest to the mind and body, and advocate six months of this for mild cases and a year for severe cases.

There is much evidence to show that the nature of the sequelae varies from epidemic to epidemic. Thus the Parkinsonian syndrome was a common sequela of the 1919 epidemic, and was practically unknown in that of 1918. On the other hand, psychomotor restlessness with nocturnal wakefulness was a common sequela of the epidemic of 1920-21, and athetoid movements of the epidemic of 1923-24.

3. *The Mental State of the Restless, Naughty Child.*

A great deal of attention has been paid to the restless, naughty child because of the social and educational problems that he raises, and much that has been written about him is wide of the mark. The moral aspect of his behaviour has been emphasized, naturally enough, as it is his apparent disregard of all moral considerations that makes him impossible at home, at school, or in the sick ward; and many have professed to see in this an absence, a numbing, or a perversion of his moral sense. Strangely enough, very little has been said about the *maniacal* character of his misbehaviour, although it has more affinity with that of the maniac than with that of the delinquent, hebephrenic, or that *rara avis*, the moral imbecile. There is nothing cunning or underhand about the misdemeanours of the restless, naughty child. Unlike the delinquent, he does not choose a convenient season in which to commit his misdeeds; he carries them out in the public eye. He acts on the spur of the moment, and his offences are quite devoid of malice prepense. On the other hand, he does not show the stolidity of the hebephrenic or the moral imbecile. He is accessible to an appeal to his better self and is not insensible to correction. Most of the outrageous incidents in which he figures arise from injudicious handling. He commits some venial offence. Everything turns on the way in which he is corrected. If he is taken the right way the matter ends in tears, but if his anger or resentment is aroused he throws the first thing that comes to his hand at the head of his censor, or indulges in all sorts of threats or abuse of him. But whichever mental state is aroused is of short duration and soon gives place to another. In short, there is any amount of instability, but little or no evidence of moral depravity, in the misbehaviour of the restless, naughty child.

If the mental state of these children be looked at as a whole, the instability that is so striking a feature of their misbehaviour is seen to be confined to no particular faculty of their minds. All their mental processes are unduly mutable. Their ideas, their moods, and the impulses of their wills are all easily induced, and, failing to develop properly, are readily supplanted by others. In consequence of this these children become the slaves of their environment. They no longer behave according to the principles instilled into them by their upbringing, but obey the whim of the moment. They become pert and forward, inclined to talk to any person they meet, and to handle whatever catches their eye. Incidental and non-essential ideas, aroused by habit of speech or similarity of sound, break into their talk, giving it a smack of precocity. On the other hand, their restlessness is far from aimless; it is really a press of occupation. They are always busy about something, and so long as their activities can be confined to useful channels they work well under supervision.

What the psychologist calls *general intelligence* is not affected by the disorder to any appreciable extent. The recognized mental tests show that the apparent precocity of the restless, naughty child is not accompanied by a high intelligence quotient. On the other hand, it is quite exceptional for one of these children to have an intelligence quotient below 85. Nothing in the nature of a secondary dementia is ever seen, even when the disorder has lasted so long as nine years. All that may be said about them is that their mental powers do not mature. They are a sort of Peter Pan—they never grow up.

4. *The Clinical Affinities of the Parkinsonian Syndrome.*

This sequela of epidemic encephalitis derives its name from the resemblance it bears to paralysis agitans. Although at the first glance the resemblance appears a close one, it does not stand detailed examination. Even where an undoubted similarity exists between the two conditions there are important points of difference. There is, for example, no doubt about the strong family resemblance between the facies of Parkinsonism and Parkinson's mask, but the former shows none of the deep furrowing of the brow that is so prominent a feature of the latter. Again, there is much in common between the posture and gait that the patients manifest in the two conditions, but the localized distribution of the muscular spasm and the "kinesia paradoxica" that are often seen in Parkinsonism never occur in paralysis agitans. As for tremor, a symptom common to both conditions, it rarely dominates the Parkinsonian syndrome as it does paralysis agitans.

The differences which exist between the two conditions are notable. In the first place there is nothing in paralysis agitans comparable to the metabolic disturbances that often

constitute an important part of Parkinsonism. In Parkinson's mask the skin of the face has not the thick, greasy look that it has in the facies of Parkinsonism, and it is never associated with sialorrhoea. Moreover, constitutional changes, such as are seen in the *forme cachectisante* or in the tendency to obesity that patients suffering from Parkinsonism show, are never met with in paralysis agitans.

When cases of Parkinsonism began to appear in Glasgow during 1919 they were often referred to as atypical cases of katatonia. This identification of the characteristic sequela of epidemic encephalitis with katatonia is in many ways more just than that implied in the term "Parkinsonian syndrome." So far as its somatic symptoms are concerned, katatonia has more in common with Parkinsonism than paralysis agitans. When well developed the facies of the two conditions are practically identical. Both show the starched look with the smooth forehead, the thick greasy skin, and the saliva dribbling from the half-opened mouth. In both conditions the tongue tends to become small, indented, and the seat of an intrinsic tremor. The posture and gait are likewise very similar, even to the presence in katatonia of a condition in every way comparable to kinesia paradoxica. On the other hand, cataleptic manifestations, which are a common feature in katatonic rigidity, are sometimes seen in the rigid muscles of Parkinsonism. Here the resemblance breaks down, for while mental changes are common in Parkinsonism, the stolidity and inaccessibility of the katatonic are never seen; indeed, it may be said that if a Parkinsonian were to become inaccessible, *ipso facto* he would become a katatonic.

V.—THE INDEPENDENCE OF BRADYKINESIA AND OF HYPERTONUS IN RESPECT OF PARKINSONISM.

BY

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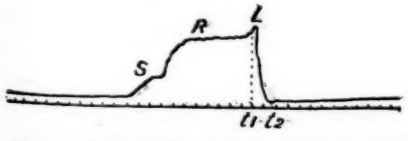
THE polymorphism of epidemic encephalitis or encephalomyelitis, which we distinguished in 1917 in describing for the first time this hitherto unknown disease, is no longer under discussion. This is the principal reason why Professor Euzière, dean of the Faculty of Medicine of Montpellier, recently said that there was no better name for this disease than the name of the author who first described it.[1]

Of the many different aspects of the disease I will consider only a single point, which I mentioned in my London lecture on the bradykinetic syndrome in 1925.[2] Many authors admit that the slowness of movement in post-encephalitic Parkinsonism, as well as in Parkinsonism in general, is an effect secondary to the peripheral muscular hypertonus. So understood, bradykinesia should be but a simple and particular case of movements which are executed against resistance. This point of view could not be maintained, and many facts show perfectly the independence of bradykinesia.



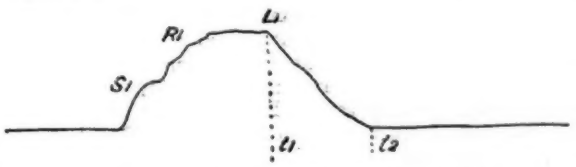
Graph showing the normal postural reflex. S, Passive rising of the tendon of tibialis anticus produced by flexion of the foot. R, Postural reflex. L, Relaxation time of postural reflex: t_1-t_2=2/5 second.

For a long time Verger and I have noticed the existence of sequels of encephalitis which are characterized only by slowness of movement without real muscular hypertonia; in such patients the postural reflexes and tendon reflexes are quite normal. It is not rare to discover hypertonia in such patients after several months. It is ordinarily of the type of Parkinsonian hypertonia, characterized by exaggeration of postural reflexes. We call by that name the postural reflexes described by Foix and Thévenard, also called by Delmas-Marsalet elementary postural reflexes.[3]

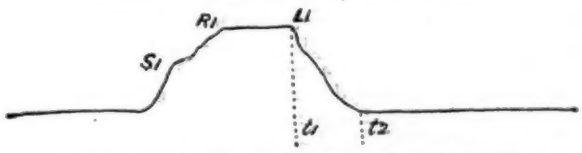
The simplest way of eliciting the reflex is to place the foot in flexion on the leg, which renders evident the postural reflex of the tibialis anticus. Thus is obtained a graph which can be resolved into three parts: The first part (S) indicates the passive response of the tendon of the tibialis anticus to the flexion of the foot. The second part (R) represents active contraction of the tibialis anticus—that is to say, the real postural reflex. The third part (L), the foot being left alone, indicates the return of the foot to its initial extensor position. This return takes a certain time (indicated on the graph by t_1 t_2), which is called the relaxation time of the postural reflex. The duration of this relaxation time varies according to the greater or less intensity of the postural reflex. Normally it is as shown on the graph. Lastly, with old Parkinsonian cases hypertonia can be transformed into a pyramidal type, characterized by ankle clonus and Babinski's sign.

Graphs illustrating the Action of Scopolamine Injection on the Postural Reflexes of a Case of Parkinsonism (Anterior Tibial).

Before injection. Relaxation time of postural reflex: t_1-t_2 =4½ seconds.

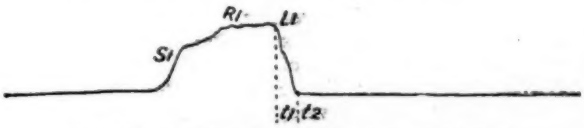


Twenty minutes after injection: t_1-t_2=2 seconds.

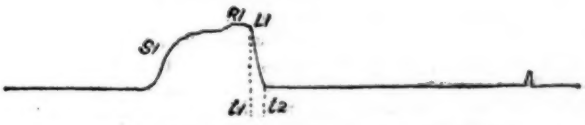


Twenty-five minutes after injection: t_1-t_2=1½ seconds.

Thirty minutes after injection: t_1-t_2=4/5 second.



Thirty-five minutes after injection: t_1-t_2=2/5 second.



Forty minutes after injection: t_1-t_2=1/5 second.

Forty-five minutes after injection. Abolition of the postural reflex and persistence of bradykinesia.

Whatever the type of case, and whether the patient is not hypertonic or his hypertonia is a Parkinsonian or a pyramidal one, bradykinesia remains exactly the same. This clinical observation, therefore, shows well the independence of bradykinesia and the variable state of the muscular tonus.

These facts, undeniable from the clinical point of view, needed an experimental demonstration. This has just been

given by one of my pupils, Dr. Delmas-Marsalet. His test is as follows: By subcutaneous injection a solution of scopolamine bromhydrate is given; this provokes in Parkinsonians a progressive abolition of postural reflexes, which is complete in about forty-five minutes. It is well seen in the accompanying curves. At the moment when the scopolamine injection has completely abolished the postural reflexes, different segments of the limb are in flaccidity, and there is no longer hypertonia.

It is most important to note that if the patient is asked to execute movements these remain distinctly slow, in spite of the disappearance of hypertonia. What is equally remarkable is that the abolition of postural reflex leaves the tendon reflex and general sensitivity completely intact. It even permits, when pyramidal irritation and Parkinsonian hypertonia are associated, the reappearance of pyramidal excitation (clonus of the knee and ankle, and exaggeration of the patella reflex), which this hypertonia had inhibited.

These different facts indicate clearly that it is useful to separate bradykinesia from hypertonia. Bradykinesia, just as much as bradypsychia, must be considered as an alteration of special nervous functions which have nothing to do with the tonus. It seems that bradykinesia represents, as Verger has said, a deficit of a general function of the brain—the automatic habit function.

Delmas-Marsalet's test in experimentally isolating the postural reflex gives a rational explanation of the action of scopolamine, known for a long time in Parkinsonians, and of the irregularity of this action. With the ordinary bradykinetic patient, without postural hypertonia, the effect of scopolamine is only moderate; the best result is obtained with the bradykinetic with postural hypertonia. When this condition is complicated by pyramidal signs the result is bad, because the abolition of postural reflexes will increase the pyramidal contracture still more. It is only in the cases in which pyramidal contracture, clinically absent, is discovered by the scopolamine test that the result is good; if this contracture is slight, it is right to use scopolamine. If this contracture is strong, it is better not to employ it.

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DISCUSSION.

Professor GEORGES GUILLAIN (Paris) said that at different periods in the evolution of chronic epidemic encephalitis, soon after the onset of the disease, or a long time after the development of a Parkinsonian syndrome, it was not exceptional to observe symptoms which resembled those of myasthenia. When they were localized only to the limbs, or to isolated groups of muscles, the diagnosis of myasthenia gravis did not occur to one; in more numerous cases, however, the myasthenic symptoms, beginning in muscles supplied by mesocephalic nerves and later becoming generalized, revealed a clinical picture identical to that of the Erb-Goldflam syndrome. In such cases either a history of typical acute epidemic encephalitis before the onset of the condition, or certain symptoms of the Parkinsonian syndrome, indicated the true nature of the myasthenia. Th. Alajouanine and he had described such cases, and recently A. Wimmer (Copenhagen) had recorded a series of similar observations. Professor Guillain wished to recall the characteristics of the myasthenic aspects of epidemic encephalitis, and gave notes of three cases which disclosed three different aspects of abnormal myasthenic syndromes. The first two closely resembled myasthenia gravis; in the first a Parkinsonian syndrome, in the second a recent epidemic encephalitis, demonstrated the infectious etiology of the myasthenic syndrome. In the third case (seen at the Salpêtrière with Dr. Thévenard) the clinical picture was partly that of an alternate syndrome of the bulbo-pontine region, and partly that of myasthenia, according to the character of the paretic troubles and their variability. The history of the disease and the influence of sodium salicylate treatment again suggested the encephalitic etiology. Encephalitis lethargica seemed, therefore, able to produce symptoms quite similar to those of myasthenia. And furthermore, in encephalitic sequelae it was not exceptional to meet with isolated myasthenic symptoms, which were absent in the clinical picture of a Parkinsonian syndrome. Such cases were interesting from the point of view of diagnosis and prognosis; they did not seem to evolve progressively and severely as did myasthenia gravis. The diagnosis, too, was made easy by the knowledge of an acute period of infection or by the observation of sequelae of encephalitic type. Meanwhile certain cases could offer difficulties in their interpretation. In such cases the electro-diagnosis did not give any real help, but with Bourguignon's technique the study of chronaxy would give new reasons for supposing an encephalitic etiology. This series of observations showed the great variability of syndromes depending on encephalitis, and allowed a new conception to be formed of the still obscure etiology of myasthenia.

Dr. E. MAPOTHER (London) said that the psychiatrist was rarely concerned with the acute phase of encephalitis, and neither its intensity, type, nor duration seemed to be correlated with the severity or character of the mental sequelae. He quoted cases indicating how spurious psychogenesis and lack of physical examination might lead to cases of encephalitis being regarded as functional psychoses and neuroses. Febrile attacks, which were apparently a recrudescence, occurred in cases with mental sequels, and sometimes led to increase of these, and also favoured the idea of continuing infection rather than maladjustment to damage done during the acute stage. Mental sequels were almost independent of neurological syndromes, and this pointed to their dependence on lesions in special foci or systems of neurons. The attribution of delinquency to infection before a stable ethical code had been organized was obviously inadequate, since it occurred in those who had been normal adults; it was clearly a regression, not merely an arrest. No "moral centre" need be postulated but derangement of levels that subserved foresight of consequences—a view that was supported by indifference to danger in some of the same patients. This point was of great theoretical importance in relation to "moral imbecility" and cases of demoralization after head injury. Dr. Marshall's identification of restlessness and delinquency seemed very questionable; often the occasional delinquent was perfectly quiet. The restlessness of the post-encephalitic differed greatly from the joyous excitement of true mania. With Parkinsonism mania was rare but suicide was common; this might be sense or insanity, but not euphoria. Lastly, the resemblance of katatonia to Parkinsonism was no greater than that of functional hemiplegia to organic, and the difference of the same order. The one was mental and the other not—doubtless a difference of level, but a material one. They could usually be simply distinguished clinically. The disabilities of the Parkinsonian were mainly in automatic activity; co-operation was ready and effort reduced disability. The usual immediate effect of urging the katatonic or hysteric to effort was increase of disability.

Dr. B. SACHS (New York) said that following the European epidemic of 1918 the first cases were seen in New York in the winter of 1918, and were reported upon early in 1919. While there had been marked variations in the number of cases seen in succeeding years, the disease had been steadily with them in New York, both in its acute form and especially in its sequelae. Dr. Sachs wished to supplant "encephalitis lethargica" by the term "central and basilar encephalitis"—which it really was. He used the term in his own writings. The history of the disease as it occurred in New York, and as reported in the volume published by the American Association for Research in Nervous and Mental Disease in 1921, tallied in every way with the account given by Dr. McKenzie of Glasgow. In later years the myoclonic and choreic symptoms were much more marked than in the earlier years. There was no doubt a gradual attenuation of the virus, and probably some change in the site of the lesion. The motor manifestations of the disease, with frequent involvement of the basal

ganglia, had gained a special importance with reference to the more recent studies of the functions of the corpus striatum. Ramsay Hunt favoured the conception of two striated systems—one for the control of the automatic and associated movements (the pallidal system), and the other for inhibitory and co-ordinating functions (the neo-striatal system). Interference with these functions was responsible for the symptoms resembling, on the one hand, those of paralysis agitans, on the other those of chorea or athetosis. When both systems were involved there might occur any possible combination of the two types of motor disorder. Some of the lesions in the acute infantile cerebral palsies might be of cortical origin, but these infantile cerebral palsies were sometimes of ganglionic origin. Dr. Sachs was in full sympathy with Dr. Marshall's report on the mental aspects of this epidemic disease, and would particularly wish to endorse what Dr. Marshall had said about the mental state of the restless, naughty child; but again he was still more impressed with the recollection of those adult cases of the disease that began with psychic symptoms (in one case a very unusual facetiousness, suggesting frontal lobe involvement), very acute maniacal symptoms, and in several instances were fatal within two weeks. Some might stop to think of the cases of chorea insaniens of years ago, so often fatal. There was also general agreement on the conclusion that epidemic encephalitis and acute poliomyelitis were distinct clinical and bacteriological entities, in spite of the contention of Neustadter, Larkin, and Banzhaf that they were able to neutralize the poliomyelitis virus *in vitro* in six instances with serums of patients recovered from epidemic encephalitis, and completely protect the six monkeys experimented upon. Amoss (1921) stressed the point that experimental poliomyelitis is readily transmitted, while epidemic encephalitis could not be transmitted experimentally with anything like the same ease.

Professor KARL PETRÉN (Lund, Sweden) said that two Swedish observers, Professor Sjoevall and the late Professor Forssner, had shown that phagocytosis was invariably present in poliomyelitis during the acute stage, and was of great importance in explaining the destruction of the motor cells; these findings had been amply confirmed by later authors. On the other hand, in encephalitis lethargica phagocytosis was usually entirely absent. These differences were in accord with the divergent courses of the two diseases. In poliomyelitis the paralytic symptoms reached their maximum intensity in a few days—almost always in not longer than four days. In contrast, how different was the course of encephalitis lethargica, a fact that it was not necessary to emphasize. Professor Petrén also called attention to the naso-palpebral reflex of Guillain in the diagnosis of the Parkinsonian state. This reflex consisted in the exaggeration of the blinking of the eyelids elicited by tapping the skin about the root of the nose. Professor Petrén had found this reflex invariably present in the Parkinsonian syndrome. Dr. Riddoch had mentioned that there was often a certain interval between the acute phase of encephalitis and the appearance of Parkinsonian phenomena. It was therefore a question of the highest practical importance to determine how long this interval could be or, in other words, how long after a patient had had encephalitis lethargica might a Parkinsonian syndrome follow. In a large experience of such cases Professor Petrén had never found this interval to be longer than four years.

Dr. W. A. POTTS (Birmingham) challenged the statements that the disease had a tendency to pass a definite course, and that the anatomical damage was permanent. For a long time there was numbing, rather than destruction, of the higher and other special brain centres. Such a conception was a better explanation of many cases, especially the not infrequent ambulatory type. So far from not resembling neurological syphilis it was similar in many ways, especially in still being amenable to treatment, if thorough and prolonged, even in late stages. There was always a choice of at least two possible courses, according to the temperament and mental outlook of the patient—namely: (1) the path of the dementia praecox type, including all its varieties, showing almost continuous abnormality; and (2) the path of the manic-depressive type, alternating between the euphoric (manic) state and the depressed state, with lucid intervals for weeks, often for months, and sometimes for years. In connexion with the diagnosis there were two important symptoms. The first was the fact that in the ambulatory case, when the patient did not leave his work for more than a day or a week-end, there was always a history of at least two or three hours during which he felt desperately ill. The second was the fact that, while in the later stages there was no loss of intelligence, there was always in children a failure of other mental faculties to develop, and sometimes an actual regression. In the adult the corresponding feature was a diminished sense of responsibility, the result of which was bizarre or immoral conduct. Dr. Potts advocated a course of autogenous vaccines or non-specific protein therapy, with investigation of the teeth and thorough investigation of the intestinal tract, which sometimes must be nothing less than a long course of Plombière's colon douching. Each symptom must be treated as a further indication of a septic psychosis not yet completely dealt with. It must be remembered that, while the most important fundamental factor was the unhealthy state of the alimentary tract and the unsatisfactory diet, it was necessary also to consider the probable entrance of the infection from the nose through the cribriform plate of the ethmoid; hence the frequency of ethmoidal sinusitis as a complication, and the fact that the majority of early signs came from the base of the brain. The first step in treatment should be thorough disinfection of the nose itself; this could not be effected by the occasional use of a watery application, but only by the daily and prolonged use of an oil solution of an efficient coagulating antiseptic to prevent further infection by the original virus or any secondary germs.

Dr. JULIAN M. WOLFSOHN (San Francisco) regretted that treatment of the chronic encephalitic had met with such poor results. Many chronic cases could be prevented by paying more attention to the acute stage of the disease. It had been his experience that few cases of the disease in its acute stage passed into the chronic stage if, no matter how slight the symptoms were, mental and physical fatigue were absolutely interdicted for six months, once the case had been diagnosed as lethargic encephalitis. The management of the acute case, after fever had subsided, included complete rest, intestinal antisepsis, and administration of polyvalent autogenous vaccine from the intestinal tract and nasopharynx.

Dr. T. A. Ross considered that "neurasthenia" was as real an entity as anything in medicine. The history sought for was a biographical one, to indicate how the patient reacted to the ordinary difficulties of life at all times. The failure to regard "neurasthenia" positively and not merely negatively had caused it to be considered as a sort of rubbish heap from which people were always extracting new diseases.

Dr. POSTON (Oldham) said that Parkinsonism, in outward appearance at any rate, was essentially a derangement of posture. He mentioned two cases, the first of which showed "spasmodic cramp of the upward glance," and indication of some vestibular excitement which was influenced by posture or position, and which reacted upon the centres controlling eye movements. The second case was one of complete external ophthalmoplegia with diplopia of six months' standing. Simple syringing of the ears with cold water enabled the patient temporarily to move his eyeballs in every direction and caused the diplopia to disappear. These and other findings led the speaker to urge that a vestibular lesion not only existed, but that it was responsible for the commonest group of symptoms—namely, the ocular manifestations.

Dr. P. C. CLOAKE (Birmingham) considered that the mental symptoms of encephalitis lethargica were of the toxic-infective type, and resembled in some features the acute mental effects of such toxins as alcohol, because neurotoxins depressed all nerve cells and especially those of the highest levels. In encephalitis, in addition to the severe local lesions, there was evidence of a depression of highest cortical functions in the characteristic organic

mental reaction of lethargy and the weakened attention and "grasp"; Dr. Greenfield had shown that there might also be visible evidence of cortical cell degeneration. The mental changes could best be understood by utilizing the conception of "neural energy," and thinking of mental and nervous phenomena as evidences of orderly evolution and distribution of energy derived from the activity of the neurons at different levels in the nervous system. Head had observed that the decerebrate cats of Bazett and Penfold responded to stimuli reflexly and purposefully, so that a drop of water placed in the ear led to shaking of the head, while touching the ear with a finger produced a different but appropriate response. This purposeful adaptive character of reflex response to stimulation was only seen when the internal and external environment of the animal was good and the nervous system was said to be in a state of "vigilance"; it was abolished temporarily, for example, when the cat was given a little chloroform or suffered from sepsis. By considering what "vigilance" implied physiologically and applying that conception to high cortical levels, a close parallelism would appear between high vigilance in the cortex and high mental efficiency, with its heightened attention and ability to respond appropriately to whatever stimuli might arise in the changing environment of the individual. Attention implied in psychology largely what "vigilance" did in physiology—namely, that condition of the mind (nervous system) in which a selective response to a stimulus could be obtained at its optimum. It was these psychic characters which were impaired in mental disturbances of toxic and infective origin. Hence arose lethargy, defective power of concentration, loss of interest, and the inability to organize reactions according to social standards which characterized the child sufferer from encephalitis lethargica and head injury; possibly the same accounted for the asthenic syndrome described by Dr. Riddoch.

OPTIMAL RHYTHM IN THE MAMMALIAN HEART AND THE ACTION OF THE CARDIAC NERVES.*

BY

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UNDER experimental conditions, with the influence of anaesthetics, etc., the mammalian heart muscle shows two distinct types of behaviour, in which the ventricular contraction force is very differently influenced by changes in the rate of beat, whether such changes owe their origin to local alterations in the normal pacemaker, to artificial or abnormal excitations, or to the influence of the cardiac nerves. In a communication to the International Physiological Congress in 1923, these types were designated I and II. Cats and rabbits were employed, anaesthetized with chloroform, ether, urethane, etc., or decerebrated during anaesthesia with chloroform and ether. Graphic records were made from auricles and ventricles by the Cushny myocardiograph or by an optical form. Intracardiac pressures, etc., were also registered in many experiments.

CHARACTERS OF TYPES.

In Type I, which is the normal, premature or much accelerated beats tend to be of diminished force, while delayed beats, as seen after a compensatory pause or during simple slowing of rhythm, usually tend to be stronger. Within limits, the longer the interval between beats the larger is the ensuing beat. The optimal interval is indefinitely long. In Type II, on the other hand, there is a certain range of interval which is approximately optimal as regards contraction force. Slowing leads to weakening, the degree of which stands in strikingly close relation to variation in the length of the intervals. Acceleration beyond the limits of the optimal rate is attended by reduced size of beat. The optimal rate varies under different conditions; it may be very much higher than the ordinary heart rate of the animal—in the cat, with its normal 90 or 100 beats a minute, the optimal rate may be 200 to 240—about the maximum rate of the heart after section of the vagi.

Sudden changes between periods of optimal and suboptimal rhythms are attended by sudden diminution or augmentation of the beats. Similarly, single beats following an optimal or suboptimal interval show immediate and striking differences in size, not depending on changes in blood pressure, but connoting a special metabolic condition of the ventricular muscle in which recovery after a contraction is rapid and is followed by early decline in contraction power, if another excitation does not occur after an interval of such duration as is suitable or optimal in the particular conditions of the muscle at the time. The behaviour of the contraction force is similar in ventricular beats due to excitatory impulses arriving from the auricles in normal fashion through the auriculo-ventricular bundle and in beats provoked by artificial stimulation of any part of the ventricular muscle.

The phenomena in question are related to what has been described as a "supernormal" phase in nerve and cardiac muscle of lower vertebrates under certain conditions. But the enlarged ventricular beats are not really supernormal; their increased size represents a return to or towards the normal from a subnormal size, which had been determined by the presence of a suboptimal rate of succession with intervals long enough to lead to a decline of contractile power below the optimum.

DISTRIBUTION AND CHANGE OF TYPES.

Type II has been seen only in the ventricles, where in a long series of experiments extending over many years it has been found to be about as common as Type I in cats. In rabbits, on the other hand, under similar experimental conditions, Type I was always recognized. The auricles of all the animals examined (cats, rabbits, etc.) always showed Type I. Repeated changes of type were often observed in the course of a single experiment. Type I is frequently altered to Type II after a phase of asphyxia or intravenous injection of adrenaline, alone or after a depressing dose of potassium, etc. Type II is often replaced by Type I after the administration of pilocarpine, acetylcholine, and other drugs. The alterations in size of beat shown by the recording lever are not dependent on altered physical conditions—for example, blood pressure, or filling of heart.

RELATION TO ACTION OF CARDIAC NERVES.

Since slowing may *per se* cause weakening of the ventricular beats in Type II and acceleration may give marked augmentation, the question arises as to how far the effects of stimulation and section of the vagus and sympathetic nerves may be conditioned by simple rate changes in the heart under experimental conditions.

The Vagus.

The records show that pronounced ventricular weakening during vagus stimulation is sometimes capable of being accounted for solely by the associated slowing of rhythm resulting from the action of the nerve upon the pacemaker. During the period of slowed weakened beats a contraction excited at the optimal interval is of full size, in contrast to the greatly weakened preceding and following beats which have come after an unduly long (non-optimal) interval. But, on the other hand, there is frequently evidence of a direct weakening influence also being exercised by the vagus—the reduction in force being specially at the earlier part of the vagus period—out of proportion to the degree of slowing. There is thus a combination of rate effect and direct force-depressing vagus influence.

In Type I the vagus can show marked weakening effects in the ventricles (as well as the auricles). Here, though associated with slowing of rhythm, the weakening is not directly due to the slowing. Simple slowing, from vagus influence on the pacemaker, apart from a direct force-depressing influence of the nerve, usually leads to enlargement of the slowed beats. When weakening is marked it bears no constant relation to the length of intervals

* A paper read in the Section of Physiology and Biochemistry at the Annual Meeting of the British Medical Association at Edinburgh.

between the beats. During vagus standstill or slowing and weakening a rhythmical series of artificial excitations calls forth beats showing a progressive increase in size (staircase); this indicates an influence inimical to the force-depressing power of the vagus on the ventricular muscle. The actual effect of the vagus on contraction force depends on an interaction between the influences of rate changes and the direct force-depressing power of the nerve. In opposition to the current view that the vagus has no direct effect on the contraction force of the mammalian ventricles the present investigation affords abundant evidence of strong weakening effects, in exceptional instances more extensive than those seen in the auricles. The weakening action of the vagus on the ventricles differs in certain important respects from what holds good in the auricles, being differently conditioned by rates of beat, etc. In the auricles vagus weakening may occur without any change of rate, and acceleration (by artificial excitations) of slowed and weakened auricles does not produce the augmenting effects seen in the ventricles.

The Cardiac Sympathetic.

As regards sympathetic action it is clear that the acceleration induced may, in Type II, determine marked augmentation in the ventricles. But it is plain that such is not the sole mode of action of the nerve, for the augmentation may be much greater than results from simply bringing the heart rate to the optimum frequency level. And large augmentation may be obtained by sympathetic stimulation while Type I is present in both ventricles and auricles. Hence rate change is only a possible contributory factor in the ventricles in Type II. There is a further specific influence beyond the direct effects of rate changes, in the case of stimulation or section of either the cardiac augmentor or the inhibitory nerves, and operative on both the auricular and the ventricular contraction force.

THE MECHANISM OF VOLUNTARY MUSCULAR FATIGUE.*

BY

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THE present inquiry deals with two forms of fatigue in man: (1) that induced by a series of voluntary contractions of the flexor digitorum sublimis, recorded by a Mosso's ergograph; (2) static contraction of the same muscle maintaining weights at certain levels and registered in the same way. Animal experiments (under anaesthesia) were also performed, the tibialis anticus of the rabbit and cat being used; contraction against an elastic resistance was registered graphically under different conditions. The relations of experimental ischaemia to the incidence and characters of fatigue were examined both in the human subject and in animals.

Fatigue from Serial Voluntary Contractions.

When fatigue results from a series of voluntary contractions the failure of effective muscular response is primarily "central"—that is, it is primarily due to defective outgoing motor impulses from the central nervous system. This is shown by the fact that further muscular response can still be obtained from electrical stimulation of the median nerve or of the muscle directly by single induction shocks or by faradic currents at rates of 40 to 200 per second. But though the fatigue is primarily central it is not always wholly so; there is evidence of marked depression of contractility in the muscle itself, at least when fatigue is induced by a very rapid series (for example, 120 to 160 per minute) of voluntary contractions, especially when the weight raised is considerable—for example, 2 kilos. Here there is an overlapping of central and peripheral changes. On the other hand, when a slow series (40 to 80 per minute) of voluntary contractions is employed to produce fatigue the muscular response to direct electrical stimulation may be practically unimpaired at the point of time when voluntary effort fails to raise the weight; the failure is distinctively central in this case.

The comparative effects of electrical excitation of the nerve trunk and of the muscle directly do not afford evidence of any marked selective influence of fatigue on the field of conjunction of nerve and muscle—the myoneural junction. The power of the contractile response obtained from (*a*) the nerve trunk, and (*b*) the muscle directly stimulated shows little difference even in advanced fatigue involving a great diminution of the available muscular energy. For example, in a rabbit's limb with intact circulation there was only a slightly greater response from (*b*) after about 50,000 contractions (pulling against an elastic resistance) had been executed in a period of four and a half hours, with reduction of the excursions to less than one-tenth of their original size. Such results are opposed to the hypothesis that comparatively early failure of transmission through the junctional region between nerve and muscle plays an important part in the genesis of voluntary fatigue.

Some previous observers have stated that after fatigue has been induced by direct electrical stimulation, voluntary effort can still cause effective contraction. In the present inquiry it has been found that after thorough fatigue has been induced by local stimulation voluntary impulses fail to elicit any marked further contraction.

Fatigue in the Ischaemic Condition.

In the ischaemic arm muscular fatigue from a series of voluntary contractions occurs much more rapidly than in the normal limb—for example, in two to three minutes, as compared with fifteen to twenty minutes. The direct depressant effects of the bloodless condition of the working muscle might be supposed to account for this, but it is found that local excitation (median nerve or body of muscle) still gives a marked, though reduced, contractile response. The fatigue is primarily in the central nervous system in this case also; weakening of the muscle develops as well, though much more slowly than the voluntary failure.

Why should central failure occur much more readily here than in the limb with normal circulation, since the central nervous system is far removed from the ischaemic area and beyond the reach of chemical agents, metabolites, etc., transmitted from the ischaemic limb? It is evidently contingent on afferent nervous impulses from the working muscle, depending on conditions set up in it by repeated strong contractions—conditions (chemical, etc.) naturally accentuated in the bloodless muscle setting up painful afferent impulses much more rapidly than in the normal arm.

Ischaemia *per se* cannot be regarded as the cause, for with quiescent muscle ischaemia up to a duration of fifteen minutes produces no discomfort and has no appreciable influence on the power of voluntary contraction. From the much earlier failure of response to voluntary effort during ischaemia it is evident that local conditions in the working muscle form part of the mechanism of fatigue. But the central nervous system is also involved, since further contractile response is given to local stimulation after voluntary effort has failed. The "central" failure is not simply a primary or direct one affecting some part of the central nervous mechanism concerned in voluntary motor discharge, but is largely a reflex effect of afferent impulses from the working muscle—no doubt protective against excessive prolongation of activity and undue development of fatigue in the muscle.

Thus the conditions of developing fatigue, arising primarily in the working muscle, do not directly induce the depression of contractile power shown in the ergographic records. Their influence is exercised in reflex fashion by afferent impulses concerned in producing the "central" failure which determines the ineffectiveness of voluntary effort (in both normal and ischaemic limbs)

Read in the Section of Physiology and Biochemistry at the Annual Meeting of the British Medical Association, Edinburgh, July, 1927.

at a point of time when there is still much contractile energy available in the muscle if effective motor impulses were provided. There is reason to regard the process of fatigue in the ischaemic limb as similar in most respects to what occurs with the intact circulation, though more rapid and acute.

Static Fatigue.

The onset of failure in this form of fatigue is of central origin, since when the continuous voluntary effort can no longer sustain the weight and prevent the shortening of the muscle from being overcome, the muscle can still respond strongly to direct electrical excitation. In this respect there is a general resemblance to the fatigue induced by a moderately slow (40 to 80 per minute) voluntary series of contractions. But in some other respects the two forms differ strikingly—for example, in relation to the influence of ischaemia.

The length of the period during which voluntary effort is effective in maintaining static contraction is very little affected by an ischaemic condition of the limb; indeed, the curves obtained in the normal and in the ischaemic states may be almost superimposable—in notable contrast to the rapid development of failure in voluntary serial contractions in ischaemia. Again, a period of static contraction has an improving effect (on contraction force), less than that of a period of rest, when interposed in the course of a series of voluntary contractions showing the progressive development of fatigue. There are indications which point to static fatigue with intact circulation as being essentially due to fatigue in the central nervous system, not dependent in any important degree on afferent impulses from the contracted muscle so far as evidence is available.

THE PINEAL GLAND.*

PROFESSOR HERRING (St. Andrews) showed a series of lantern slides illustrative of the histology of the pineal region of the mammalian brain. It was pointed out that the pineal body was not the remnant of the parietal eye found in some of the lower animals. The pineal body was a separate structure which was developed behind the parapineal organ or parietal eye. In man and most mammals the pineal body was bound up with the habenular and posterior commissures, but in the rat the pineal body lay on the surface of the brain between cerebrum and cerebellum. In this animal it was an isolated and highly vascular body which was suggestive of an organ of internal secretion. The pineal body of the cat was innervated only by fine nerve fibres, which entered it with the blood vessels. The mammalian pineal body contained a material which produced contraction of the melanophores of the tadpole, but its function was as yet unknown. Attention was drawn to the subcommissural organ of most mammals, which Dendy regarded as a receptor brought into action by changes in tension of the fibre of Reissner. The organ was well developed in most mammals, but was rudimentary in man.

PROTEIN METABOLISM IN CYSTINURIA.*

PROFESSOR D. MURRAY LYON and Mr. W. ROBSON, D.Sc. (Edinburgh), in a joint contribution, stated that various aspects of protein metabolism in a case of cystinuria had been studied. Cystine added to the diet to the extent of 20 grams over a period of four days was found to be quantitatively oxidized to inorganic sulphate. Likewise other amino acids were found to follow the normal paths of metabolism and to lead to increased urea excretion. Addition of sodium bicarbonate caused an increased output of cystine, practically the whole of it being in solution in the urine and only a small part in the urinary sediment. Disodium phosphate had no appreciable effect in producing the alkalinity necessary to hold in solution the cystine excreted. Changing the diet to one containing more protein gave rise to an increased excretion of cystine. The position of the "inborn error" was discussed.

* Brief abstracts of communications to the Section of Physiology and Biochemistry at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

MODES IN WHICH DRUGS HAVE BEEN INTRODUCED TO USE.*

BY

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THE early history of the introduction of remedies is closely interwoven with the origins of primitive religions and, while reserving judgement on the theory that some animals have a crude idea of "first aid,"[1] it is highly probable that, since man's continuous effort has been to overcome the obstructions of Nature to his welfare and progress, his selfish instincts must have led him to seek means of defence against his personal injuries and diseases even before he evolved a communal religion.

The customs of primitive tribes show that the etiologies of diseases and misfortunes were first ascribed to malevolent human agencies, then to the interference of demons, and, progressively as religious beliefs developed, to infringement of a taboo, to neglect of ancestral spirits, and, finally, to an offended deity.

Among the least cultured peoples treatment commenced as a magical rite or exorcism, associated with the external application or internal administration of some medium; this medium or "drug" was essentially an amulet aiding the protection of the individual or the expulsion of the demon; in Polynesia, for example, the medicine given was "considered more as a medium by which the god would act than as possessing any power itself to arrest the disease."[2]

When these primitive rituals had as objective the benefit of the individual they became the basis of primitive therapy, but when they had as purport the protection of the community from pestilence, famine, or other calamity, they became the foundations of religious belief or of public hygiene in the tribe.

As diseases became differentiated so the number of etiological demons multiplied; thus, there were evolved specialist medicine men and an expanding list of exorcising remedies of specific purport; in other communities exorcism or propitiation of several demons or deities was attempted by repetition of the magical rite or by numerical grouping of the remedies or the times of their administration. A typical instance of this phase is recorded by Rivers at Eddystone Island, where epilepsy is treated by stroking the patient with four leaves and calling on "four ancient women" of the tribe, the treatment being performed on the last four days of the waning moon and repeated after four months.[3] This case shows the primitive use of herbs purely as amulets, associated with the numerical arrangement of the rite and the herbs to influence four etiological factors, and indicates a primitive belief in the influence of the satellite on epilepsy.

Early Vedic literature provides confirmatory evidence of these views; thus, in the Atharva-Veda (*circa* 1000-700 B.C.), treatment is uniformly magical in type and curative agencies are amulets; the exorcisms may be directed against a human sorcerer or demons, or an offended deity is propitiated.[4] The remedies were chosen on religious or mythical grounds; thus, butea and the soma plant were of great holiness; lead,[4] catechu, colocynth, cannabis, and mustard had potent demon-dispelling powers; while curcuma was used for jaundice because of its yellow colour—a type of sympathetic magic.[5] Liquorice was a charm to secure the love of women, and ricinus was a component of a battle charm.[4] In Zoroastrianism also drugs were utilized chiefly as charms to expel demons.[6]

Although there is some evidence, both from the primitive tribes in the Philippines and in America and also from the classical period, that drugs were tested upon animals and sometimes upon man, the evidence from primitive medicine regarding the evolution of drugs is against experimental therapeutics and in favour of the opinion that they were originally used for driving out the demons of disease from the body; hence we find in primitive therapy a preponderance of remedial measures having effects as purgatives,

* Read in the Section of the History of Medicine at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

emetics, anthelmintics, etc., and of physical means such as bleeding, cupping, counter-irritation, and massage. Comparative philology also supports this contention by affording proof that in many languages the root which implied "magic" or "incantation" produced stems to which were applied the transferred meanings of medicine—remedy, poison, or physician.[7]

As, however, diseases became clinically defined, experience proved the empirical advantage of certain herbs or formulae. Two probabilities now arose: (1) the use of the drug might be continued while its magical rite was discarded, or (2) the symbolical ritual might be preserved—especially through folk medicine—and the remedy become obscured by admixture with others. This transitional phase is illustrated in Assyro-Babylonian tablets.

Our knowledge of Egyptian civilization affords proof that even in the first to third dynastic periods it was possessed of cosmetic pomades and paints, but the earliest medical treatises—the papyri of Ebers, Hearst, Smith, London, etc.—are all from a period approximating 1500 B.C., which may be regarded as a climax of Egyptian therapeutics. The Egyptians had, on the evidence of the Ebers Papyrus at least, largely discarded the incantation, but this papyrus contains many prescriptions consisting of four remedies which are to be given on four occasions. The numerical grouping is evidently an endeavour to propitiate the four sons of Horus, who guarded the four corners of Heaven and who presided over specific organs of the body;[8] here we have an origin of the doctrine of physical and physiological fours.[9] The Ebers Papyrus was a temple formulary which it was sacrilegious to amend, but the priest-physician might record against prescriptions of proved value the words "Good to use"; it shows, therefore, a break away from theurgy and an attempt to establish empiricism. The formulae are difficult to analyse, partly because of unidentified ingredients and partly because the active ingredient is rarely placed first, but, assuming that some of the formulae gave a measure of effective result, there is reasonable ground for believing that we owe to the Egyptians an elementary pharmacology of the following remedies:

Emetics.—Copper salts, squill.

Purgatives.—Figs, dates, raisins, aloes, ricinus seeds, sea-salt, artemisia.

Carminatives.—Caraway, coriander, juniper, myrrh, mentha (? pulegium), fennel, dill, onion.

Astringents for Diarrhoea.—Lead salts, egg-albumen, gruel.

Worms.—Ascaris: Pomegranate root bark, artemisia, ricinus seeds, sea-salt, copper subacetate. *Taenia:* Ricinus seeds, artemisia, mentha, lead salts, sea-salt.

Aaa Disease (?hookworm).—Turpentine resin, artemisia, mentha.

Meal and linseed were used to make poultices, and to these were added herbs containing volatile oils which would act as counter-irritants; for wounds, poultices containing sea-salt, onions or aromatic herbs, and wine are advised; while conjunctivitis was treated by salves containing metallic astringents—for example, salts of lead or copper. Juniper and sea-salt occur frequently amongst diuretic prescriptions. Other drugs, of which the purpose is obscure, are opium poppy capsules—possibly also the juice—hyoscyamus, hemlock, zinc oxide, and iron sulphate.[10]

There is no doubt that the knowledge of Egypt filtered through to contiguous nations, and Assyro-Babylonian tablets dating from about 600 B.C., when the Assyrian physician had not succeeded in divorcing medicine from magic, contain recipes which may be grouped into two types—older forms redolent of exorcisms, and newer forms which are simply prescriptions. Assyrian remedies which have not been clearly established in the Ebers Papyrus are sulphur for itch, attar of roses, bitumen, almond oil, galbanum, alum, liquorice, and anise.[11]

In Brahminical therapy a great improvement occurred between Vedic times and the Charaka-Susruta period (*circa* first to fifth century A.D.). Accumulated experience enabled Charaka to evolve fifty groups, each containing ten herbs, which he thought "enough for the purposes of an ordinary physician." His classification is made on a pharmacological basis and, to epitomize, there are quoted as emetics, salt, mustard seeds, and copper sulphate; as purgatives, castor oil, cassia fistula, turpethum, and sulphur and mercury preparations; and, as an anthelmintic, embelia. Cannabis was recognized to be sedative, and datura as inebriant, but nux vomica seems to have been regarded as narcotic. Cardamoms, chiretta, and cane sugar had also been brought into use.[12] This rapid development of Hindu medicine is often regarded as a result of Grecian influence, but this is difficult to accept, since most of the remedies are indigenous. It seems more likely that investigation of native herbs by the Brahmins was inspired by travellers from Egypt and Assyria in a period (Ayur-Veda) anterior to Charaka.

About 1000 B.C. Egyptian and Mesopotamian therapy began to influence Greece; thus Homer tells of Helen receiving from the Egyptian Polydamna her knowledge of a soporific, which was probably opium, to abolish grief and pain, and he testifies to the superior skill of Egyptian physicians.[13] Homeric therapy shows little trace of theurgy, but in the Asklepian temples drug therapy became subordinate to mysticism,[14] and it was only when the Asklepiads divorced themselves from the priesthood at Cnidos and Cos that medicinal substances received appropriate homage again. The majority of the drugs in the Hippocratic collection are of Egyptian origin, and there are traces of resemblance in some prescriptions to those of the Ebers Papyrus; the few remedies of Indian origin were probably acquired through Phoenician traders.

I must not delay to eulogize Hippocrates: historical times have been reached, with a substantial materia medica derived from ancient civilizations; the list was constantly being increased by addition of herbs collected by the physicians themselves or brought to them by the pharmacopoloi, botanologoi, and rhizotomoi. This knowledge was collated by Theophrastus in his *De Historia Plantarum*, a treatise describing some five hundred herbs. That the actions of these drugs were imperfectly understood needs no emphasis, but attempts were made in the Alexandrian school by Herophilus and Heracleides to determine their activities and regulate their mode of administration—for example, those of opium as a soporific. In the same period the insecure tenants of thrones instituted pharmacological experiments upon their subjects, and to Mithridates VI. King of Pontus, or his rhizotomist, Kratevas (120-63 B.C.), is due the universal antidote mithridation and the conception that tolerance to poisons may be acquired. During this period the doctrine of the four humours developed, and its extension to the four qualities of drugs, which did much to obscure their actions during the dark ages; the doctrine, although ascribed to the Pythagoreans, was, there is little doubt, founded on Egyptian religious tenets.

With Rome as the centre of culture there commenced a period of polypharmacy and uncritical empiricism, when the rarity, secrecy, or complexity of the compound was its chief claim to virtue, as in the famous theriacum of Andromachos—a panacea of some seventy ingredients—which remained in vogue till the *London Pharmacopoeia* of 1746. The Roman period, however, was not entirely decadent, and Dioscorides deserves recognition for his attempt to simplify therapeutics by his succinct descriptions of the remedies of his times.

I must leave the early results of empiricism with the statement that, by making a rough classification of the present vegetable materia medica, we can discover that 30 per cent. of the crude drugs are mentioned in the Ebers Papyrus, Assyrian tablets, or early Brahminical treatises; that 37 per cent. were known in classical times; and, by including the drugs introduced by the Arabian school, we reach 50 per cent. of the whole. Among the remedies handed down from antiquity occur practically all the demulcents, flavours, or carminatives, purgatives, and anthelmintics; of bitters, gentian occurs in Dioscorides and chiretta as a febrifuge in Susruta; orange and lemon escaped Greco-Roman notice and were introduced by the Arabians. Of vegetable astringents, galls, myrobalans, and bael fruit were used, but astringent metallic salts were preferred; squill, which was probably only an emetic with the Egyptians, was a diuretic for dropsy in classical times. Opium was recognized as a soporific, and hyoscyamus and datura as deliriant narcotics; knowledge

of the sedative properties of cannabis seems to have been transferred from India to the Arabians.

It may be said that, with the exception of the drugs introduced by the Arabian school—namely, rhubarb, senna, camphor, nutmegs, cloves, sandalwood, cassia, and tamarinds, which probably emanated from India—the materia medica of Dioscorides was the foundation upon which medicinal treatment was based down to the advent of the renaissance in medicine, and that confusion of the pharmacological facts discovered by the ancients resulted from the doctrinal controversies concerning therapy which were waged down to within comparatively recent times.

The next important source of new remedies was the discovery of America, but the accounts of the introductions give us little concrete information as to the original reasons for their selection. Tobacco was discovered in Cuba in 1492, and guaiacum wood (lignum vitae, lignum sanctum) reached Europe from San Domingo shortly afterwards. Freind states that Gonsalvo Ferrand, in search of a cure for syphilis, found guaiacum used with success in the West Indies, and was the first to import it;[15] but Oviedo is also credited with its discovery in 1514.[16] Its fame as a treatment for the "French Pockes" must have spread rapidly, because its virtues were extolled in 1519 by Ulrich von Hutten, whose work was published in English by Thomas Paynell in 1536;[17] and it was mentioned in conjunction with mercurial inunctions and fumigations by Fracastoro in 1530.[18] It was Paracelsus, of course, who popularized the employment of mercury internally in the disease.

A little later sarsaparilla was introduced from New Spain and Honduras, and from about 1553 was recommended in the sudorific treatment of syphilis.[19] Jalap root was found in Mexico, and the Spanish physician Monardes refers to it in 1565 as the "rhubarb of the Indies"; the same author seems to have introduced the balsams of tolu and Peru.[20] The use of ipecacuanha for the "bloody flux" in Brazil is recorded in 1625 on the authority of a Portuguese friar,[21] but it was not until 1680 that Helvetius, acting on information gleaned from a Paris merchant, advertised its virtues in dysentery and, having successfully cured the Dauphin of France by its aid, sold his secret to Louis XIV for 1,000 louis d'or.

The mode of introduction of cinchona is almost mythological. Local legend suggested that the waters of a lake, into which cinchona trees had been overthrown by an earthquake, were found curative of ague, but it seems more probable that the value of the bark was known in Peru, and that a grateful servant imparted the knowledge in 1630 to the Governor of Loxa, who transmitted it eight years later for the treatment of Countess Ana of Chinchon, wife of the Peruvian viceroy. Her cure led to its use a year later in Madrid under the name of "Countess's powder." By 1650 it had been widely distributed by the Jesuit priests, and acquired the name "Jesuits' powder." Thomas Willis mentions its value, and Sydenham in his *Methodus Curandi Febres* (1666) describes its use; but Sir Robert Talbor, an "irregular" practitioner, was mainly responsible for establishing its use by effecting with it the cures of Charles II of England and the Dauphin of France.[22]

The seventeenth century gave birth to physiology and histology, but the irrational and unsavoury list of nearly 2,000 remedies which in 1618 constituted the first *London Pharmacopoeia* was an infant in which the sins of its fathers for more than the third or fourth generation were apparent; even Culpeper, immortal quack, could make merry at its expense!

The eighteenth century has a more creditable record; the fourth and fifth *London Pharmacopoeias* were still redolent of skatological, astrological, and folk therapy, but the critical essay *Antitheriaka*, by William Heberden (1745), was successful in banishing mithridate, theriac, and other superstitious nostrums from the sixth *Pharmacopoeia* of 1788, in which were approved the "diaphoretic powders" of Thomas Dover and of James, kino, which we owe to Fothergill, and senega, which, used by the Indians for rattlesnake bite, was advised by Dr. Tennant, a Scotsman in Virginia, for pleurisy and pneumonia.

About this period Thomas Fowler, an apothecary of York, who had acquired an Edinburgh degree, analysed a patent medicine which was advertised as "Tasteless ague and fever drops," and found it to contain arsenic. He devised the well known "Fowler's solution" (1786), and reported its effects in agues, remitting fevers, and periodic headaches; credit for the rational use of arsenic is thus due to a quack remedy.

Two triumphs resulting from the observation of folk medicine were the establishment of vaccination by Jenner in 1796 and the introduction of digitalis by Withering, an Edinburgh graduate, in 1785.[23] Ergot also was probably derived from folk medicine; it was known as an abortifacient during the sixteenth century, but did not come into general use as a uterine stimulant till the beginning of the nineteenth century.

The rapid advances in the nineteenth century were consequent on the development of chemistry with its discovery of the alkaloids, and upon the knowledge gained through experiments upon animals; Magendie (1821) was a pioneer in determining the actions of bromides, strychnine, and morphine, and in showing their therapeutic applications. Magendie's mantle descended upon the Edinburgh school, and I need merely mention the names of Sir Robert Christison, David Waldie, Sir James Young Simpson, Alexander Crum Brown, Sir T. Lauder Brunton, Sir Thomas Fraser, and Sir E. Sharpey-Schafer to recall to mind the therapeutic advances for which experimental investigations were responsible. Another cradle of experimental work was Dorpat, through which passed to larger spheres of influence Dragendorff, Buchheim, Schmiedeberg, Kobert, and Hans Meyer.

The number of drugs introduced by modern experimental methods has been large; those which have survived the test of clinical experience are familiar to all, and I need do no more than remind you of some outstanding examples. Carbolic acid was introduced as an antiseptic by Lord Lister in 1867; amyl nitrite for angina pectoris by Brunton in 1867; chloral by Liebreich in 1869; cocaine as a local anaesthetic by Koller, and antipyrine by Filehne in 1884; strophanthus by Fraser in 1891, and adrenaline by Sir E. Sharpey-Schafer in 1894.

The late Sir Clifford Allbutt once said of Freind's *History* that "he spread his net too widely"; the present endeavour to epitomize the evolution of remedies suffers from the exigencies of time and space, but its imperfect generalizations will, I trust, induce some of my readers to elaborate and qualify the principles which in various periods have been involved in the introduction of new remedies.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TRAUMATIC RUPTURE OF MALIGNANT OVARIAN CYST.

THE circumstances of this case render it worthy of record.

A girl, aged 17, in good health, while at play with some of her fellow workers, received a severe blow in the abdomen, somebody jumping on to it. Shortly afterwards she was seized with severe diffuse abdominal pain.

On admission to hospital the temperature was 99.8°, the pulse 104, and the respirations 28; the upper half of the abdomen was tender and the upper half of the right rectus rigid; no bruising of the abdominal wall was observed. The patient's condition improved soon after admission and it was decided to wait. Two days later signs of free fluid in the abdomen were evident and operation was urged.

Operation.—The abdomen contained a large amount of clear pink fluid; a large polycystic papilliferous ovarian cyst on the left side had ruptured; the right ovary was cystic, and there was a tear 2 inches long in a loop of small bowel, which had penetrated down to the mucous coat. The rest of the abdominal organs were healthy. Both ovaries were removed, the tear in the bowel sutured, and the abdomen drained. The patient made a good recovery.

The pathological report was to the effect that there was a columnar-celled carcinoma of the left ovary.

On examining the patient two months after discharge from hospital the whole of the left iliac fossa was found to be occupied by a hard painless mass.

The patient died at home seven months after the injury; no *post-mortem* examination was made.

My thanks are due to Dr. J. F. Hodgson for permission to publish this case.

Northwood, Middlesex. H. JAFFÉ, M.R.C.S.

CONGENITAL OCCLUSION OF THE SMALL INTESTINE.

ON June 26th a female infant, 36 hours old, was admitted to Dewsbury Infirmary because it had not passed meconium since birth, nor had any come away while the child was being born. It was well nourished, weighed 8 lb. 2 oz., and was normal in every way except for slight distension of the abdomen. A thick plug of mucus was passed after a rectal examination, which discovered nothing abnormal.

The infant vomited on an average three times a day, but seemed to retain part at least of its food. Aperients and enemata were tried repeatedly, but no movement of the bowels occurred. The superficial veins of the abdominal wall became enlarged and visible as longitudinal channels with transverse communicating branches, the abdomen became cyanosed, and on July 16th the child, which had gradually become emaciated, though not extremely so, died.

On *post-mortem* examination it was found that the stomach and the proximal half of the small intestine were considerably enlarged, the small intestine appearing as large as in the adult state, and terminating abruptly in a bulbous end. From this the remainder of the small intestine was continued as a small tube, about the size of a goose quill, and caecum, vermiform appendix, and the whole of the large intestine were present in perfect miniature. The portion of the intestine below the dilatation had a complete lumen, which contained nothing of the nature of meconium. The contents of the upper portion were fluid and yellow. Between the dilated and undilated portions of the small intestine there was a complete partition of mucous membrane, which exhibited only a dimple at the point where the continuity should have been unbroken. The point of occlusion was well below the point of entry of the bile duct, and its existence is explained as being due to proliferation of the epithelium in the second month of foetal life.

BERNARD SHEA, M.B., B.Ch.

General Infirmary, Dewsbury.

A CASE OF SCLERODERMA.

CASES of scleroderma are of sufficient rarity to warrant a short description of a case I had under my care for several years.

The patient was a girl apparently normal in every way, mentally and physically, until she reached the age of 10. It was then noticed that a few hairs in the right forehead were becoming white and that below on the brow was a patch of skin about the size of a penny which the mother described as of a "putty colour." There was no disturbance in her general health. The patch gradually extended and fresh areas started on the right side of the neck, extending as far back as the spine, and a line ran from the shoulder down the inner side of the arm and forearm. The eyebrows and eyelids became white on the affected side. A few weeks later the lardaceous "putty-coloured" patches showed signs of brown pigmentation, and at the same time the right side of the back commenced to discolour in patches, with two well defined bands running forward, one to the lower end of the sternum and the other just above the umbilicus, having the same distribution as the usual herpes. A very definite line appeared from the right anterior superior spine to the inner side of the knee and a few diffuse patches on the anterior surface of the leg and foot.

The whole process gradually developed, all the lardaceous discoloration eventually becoming deeply pigmented (see photograph of face). The area of hair affected extended, the right axillary hairs became white, as also did the right half of the pubic hairs. The bones on the whole of the right side of the body, including skull, jaw-bones, and clavicle, ceased to grow, excepting the arm, which I think grew an inch in length after the onset. Use in the limbs became markedly impaired, particularly the leg.

About six months from the onset deep ulceration occurred on the anterior surface of the leg. It continued for eighteen months, and at the end the limb was completely withered and useless, the muscles, bones, skin, and tissues becoming glued together and atrophied. During this time the pigmented skin had become hard and non-elastic; the mouth had become "drawn" by the contraction of the skin, and the ear had partially undergone a similar movement. The gums and lips on the right side atrophied and the teeth on this side were exposed almost in their entirety. The tongue was smaller on the affected side, and the right nostril became more or less obliterated. Salivation became very troublesome, and the right corner of the mouth eventually developed into an ulcerated mass. To add to her burdens, she became completely deaf in the right ear and almost blind in the right eye. The use of the arm improved a little at the end of a year. It never became ulcerated or ankylosed as did the leg, and she was able with difficulty to do knitting and crochet work.

She lived for ten years after the onset. The left side of the body grew normally. She was not affected mentally at any time. She eventually developed tuberculosis in the right lung and died from a profuse haemoptysis.

She had not had any previous illness, and the family history revealed nothing abnormal; the other eight children are well and alive to-day, as also are the father and mother.

ARTHUR W. TIBBETTS, M.R.C.S., L.R.C.P.

Cradley Heath, Staffs.

PITYRIASIS ROSEA: A SECOND ATTACK.

IT is exceedingly rare to meet with a second attack of pityriasis rosea; Graham Little described one in 1915. Owing to this rarity, as well as the strong suggestion of direct inoculation which occurs in it, the following cases may be thought worthy of record.

CASE I.

In August, 1923, a mother brought her child, aged 10, as she feared the girl had ringworm of the body. She had noticed a red ring on the child's right flank the day before, and I found, midway between the costal border and the crest of the ilium, an oval, slightly raised patch, pink and scaly at the margins, dull yellow at the centre. The child said that the place itched slightly. The lesion had none of the characteristics of ringworm, and no fungus was discovered by the microscope. There was no question of syphilis, seborrhoea could be excluded, pityriasis capitis was not present, and there was no doubt that the patch was the herald of pityriasis rosea. In the course of two or three days the first crop of lesions appeared, and by the end of a week the eruption had developed in the typical vest area of pityriasis rosea. I ordered baths of Condy's fluid and a salicylic acid ointment (2 per cent.). In ten days the child was free of the disease. The eruption had consisted more of medallions than of rose-coloured spots crowned by a fine scale, though both types of lesion were present. There was no fever and no glandular enlargement. The stomach was normal in size.

CASE II.

First Attack.—Fourteen days after I saw this patient for the first time I discovered on my own person, midway between the umbilicus and the xiphisternal angle, a reddish-yellow spot, slightly irritable, which rapidly developed into a typical herald patch. In the following seven days successive crops of spots appeared, most of them becoming medallions with central yellowish areas and pink at the margins. The eruption occupied exactly the short-sleeved vest area, and included the upper part of the thighs. There was slight itching. No fever and no glandular enlargement were present. I used baths of Condy's fluid daily, and my skin was clear of lesions in three weeks.

Second Attack.—This occurred in January, 1927. I discovered the primary lesion in the same place as before. It rapidly developed into the typical herald patch, and in the course of seven days the eruption was complete, occupying strictly the vest area, as before. In contradistinction to the previous attack most of the lesions were macular. A certain number of these smaller

lesions had urticarial characteristics. There was again slight irritation, but no fever or glandular enlargement.

On this occasion I employed no treatment at all, being curious to know how long the disease would last. I was clear of lesions in eight weeks.

The cause of this obscure and comparatively rare disease is unknown. A curious fact, however, demands mention. In examining the child whose case I have described, I gently scratched the lesion on her body with the nail of my right forefinger; and immediately afterwards, feeling the effects of the industry of pulex irritans (donation of a previous patient), I involuntarily applied this finger to the spot where I felt the irritation—that is, midway between the umbilicus and the xiphisternal angle, and slightly scratched the place. This was the area where I subsequently found the primary lesion of pityriasis rosea in myself. It might, of course, have been mere coincidence; but if the disease be of microbic origin it is at least conceivable that I inoculated myself, by scratching, with the causative agent.

Vidal in 1882 described the *Microsporon anamaeon*, which he believed to be the cause. Du Bois has found a cryptogamic organism with small spores in the glandular orifices and follicles. Neither of these organisms has been shown to be the cause.

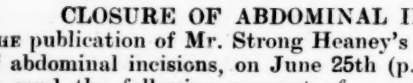
Although there is no certain evidence of contagion in pityriasis rosea, yet the primary medallion, succeeded by an eruption of secondary lesions, suggests the possibility of microbic origin. I think the history of my first attack significant, though I cannot account for my second. I had not seen a case of the disease in the interval between the two attacks, though it is of course possible that I may have been in contact with a case in a public conveyance or place, or I may have examined a patient in whom the disease was going to occur. It is curious that the disease should be so strictly confined to the vest area.

Manchester. B. GORDON EDELSTON, M.D., B.Ch.

CLOSURE OF ABDOMINAL INCISIONS.

THE publication of Mr. Strong Heaney's note on the closure of abdominal incisions, on June 25th (p. 1143), induces me to send the following account of a method I have often used.

Three strips of good antiseptic adhesive plaster, 14 to 16 inches long and 2 inches wide, are cut as shown in the diagram, each bridge being 2 in. long. After placing a moderately hot pad over the abdominal surface for a minute, the skin is dried, the plaster applied first on one side, far enough to allow the bridges to rest over the wound as the assistant, gripping the abdominal wall, brings the edges of the incision into apposition; then the other end of the plaster, tightly drawn, is applied to the opposite side. With the three strips thus applied the edges of the wound are held tightly together. A little bismuth-formic-iodide is then dusted over the wound and the dressings applied. If necessary, they can be removed daily, and the condition of the wound observed. I have found that the plasters hold firmly even in cases of severe vomiting after the operation. This method could be applied to any part of the body, or face and extremities, where the surface is suitable, thus rendering it unnecessary to stitch a face wound in particular. The size of the strips depends on the size and locality of the wound; thus, on the face, I use strips 3 inches long and 1 inch wide, with only one bridge in the centre. By this method, if on daily examination the wound does not look too healthy, hot antiseptic pads might be applied.



Ceylon. HUGH KEITH.

CONGENITAL TUMOUR OF THE BREAST.

CONGENITAL tumours of the breast are sufficiently rare to make the following case worthy of publication.

On November 17th, 1926, I saw a male Hindu infant, fourth in the family, aged 3 days. The birth had been attended by a trained midwife under the supervision of the health visitor, and was reported as normal. There was a well defined swelling about the size of an orange on the outer side of the right nipple, which pushed the arm away from the side. The swelling was cystic, not adherent to skin or muscle, and appeared to have no connexion with intrathoracic contents. No secretion was obtained from the nipple, and no enlarged glands could be felt.

The infant was breast-fed, and seemed to suffer no inconvenience apart from the pushing of the right arm away from the side. No treatment was undertaken, but the infant was seen weekly. It was proposed to operate at once if the swelling increased in size. I last saw the infant on March 2nd, 1927, when the swelling had decreased to the size of a walnut. The family then moved to their village, and the further progress of the swelling cannot be watched.

I am indebted to the civil surgeon, Colonel T. Hunter, for advice and for seeing the case from time to time.

CICELY N. TWINING, M.R.C.S., L.R.C.P.,
Late Medical Superintendent, Maternity and Child Welfare, Lucknow, India.

Christchurch, Hants.

Rebiews.

THE PATHOLOGY OF THE PITUITARY GLAND.

IT was in the year 1886 that Marie introduced us to the disease which he named acromegaly, and which on the anatomical side is characterized most obviously by the enlargement of certain structures of the body, among them the pituitary gland, at that time regarded as a structure of no importance. This was the starting point of a series of observations which form one of the most fascinating chapters in medical science. In the forty years that have since elapsed we have learnt that the pituitary gland is one of the most important organs in the body, some half-dozen different diseases or syndromes have been defined as dependent on its dysfunctioning, the effects of a deficiency in its secretion have been demonstrated experimentally, and the experimental induction of a condition analogous to hypersecretion has recently been successfully accomplished by Evans of the University of California and Tracy Putnam in Cushing's laboratory. The time is, therefore, favourable for taking stock of our position as touching our views on the nature of acromegaly and of the possible directions in which further advance is to be looked for, a subject which has been expounded with great clarity and personal charm by HARVEY CUSHING in his oration before the Medical Society, published in the first two numbers of this volume of the BRITISH MEDICAL JOURNAL, and with some additional details in his monograph on acromegaly,[1] written in collaboration with LEO DAVIDOFF and published by the Rockefeller Institute for Medical Research.

When the functional importance of the pituitary gland came to be recognized it was natural that a causal connexion between the gland and acromegaly should be suspected, and it was thought, somewhat illogically it would seem, that the constantly observed enlargement of the organ indicated a diminution of its secretory activity. Experimental removal of the gland, however, proved that this was not the case, and that a diminution of function caused by partial removal was followed by effects that were just the reverse of acromegalic. Opinion then veered round in the direction of hyperpituitarism, and this view held its ground in spite of certain difficulties which presented themselves and seemed to militate against it. There were cases in which the lesion seemed to be unquestionably destructive in its effects, actual neoplasms for example; while from time to time the *post-mortem* examination revealed no enlargement of the pituitary gland at all. The slight logical uneasiness incident to the latter fact was, of course, readily allayed by the consideration that a gland might be secreting in excess, although not enlarged. These difficulties have, it seems, been definitely removed by a notable discovery made by Benda in 1900. He has shown that the cells of the pituitary enlargements in acromegaly always contain acidophile cells (cells containing granules stainable with acid dyes such as eosin) similar to those present in the normal gland, and that this is the case even where the lesion was regarded as an actual neoplasm. In other words the

[1] *The Pathological Findings in Four Autopsied Cases of Acromegaly, with a Discussion of their Significance.* By Harvey Cushing and Leo M. Davidoff. Monographs of the Rockefeller Institute for Medical Research, No. 22. New York. 1927. (Sup. roy. 8vo, pp. 131; 104 figures. 2 dollars.)

apparent neoplasms were shown to be in reality hypertrophies. As with thyroid enlargements, there is room for discussion of the best designation for such tumours, whether hyperplasia, nodular hypertrophy, or adenomatous hypertrophy; the point of importance is that the constant presence of acidophile cells in all enlargements which are associated with acromegaly may reasonably be held to indicate an active secretion. With regard to those cases where no enlargement of the gland is present, it has been shown in one or two instances that the number of acidophile cells is increased, and it remains to be ascertained whether this is so in all.

There cannot now be any reasonable doubt that acromegaly is caused by overfunctioning of the pituitary gland, though we have no evidence as to what brings this about. Further progress in the immediate future is indicated rather in the direction of defining the complete syndrome in acromegaly, attention in the past having been riveted somewhat exclusively on the skeletal and pituitary changes. Cushing and Davidoff have taken up this line in their monograph, with a view to rounding off the clinical picture of the disease. They have made a thorough anatomical examination of the tissues and organs in four cases differing considerably in their clinical course and manifestations, and by a comparison of results have ascertained what changes are common to all four and are therefore probably directly due to the pituitary lesion, and not to some secondary influence. The constant findings in these cases were (1) the commonly recognized overgrowth of the mesodermal tissues; (2) the less commonly emphasized and disproportionate enlargement of the viscera, especially the liver and kidneys; (3) more or less general polyglandular anomalies accompanied by a tendency to the formation of adenomata; and (4) a hyperplasia or adenoma of the pituitary gland. With regard to the polyglandular changes, some of the organs—the sexual glands for example—tend to become atrophic, others, like the pancreatic islets, appear to become functionally inactive or at least counteracted in their normal activity, while still others—the thyroid, parathyroids, thymus, and adrenal cortex—are not only enlarged but appear to be functionally activated. Moreover, the tendency of these glands to become adenomatous like the pituitary gland itself is so marked that it would seem almost justifiable to speak of acromegaly as a disease characterized by a pluriglandular tendency to adenomatous formations.

It would not be unreasonable to suggest that these polyglandular changes may be due to one common cause acting on the glands independently, and not indirectly through the pituitary gland. Against this there is the fact that extracts of the pituitary gland are capable of producing, in an experimental animal, overgrowth not only of the mesoblastic tissues, but enlargement of the viscera as well, together with changes in the ductless glands comparable to what is seen in acromegaly.

CYSTOSCOPY.

MANY foreign works on cystoscopy have appeared, but few in the English language. Mr. J. B. MACALPINE'S *Cystoscopy*[2] has, therefore, few British competitors. It is more than an atlas of cystoscopy; it is a theoretical and practical handbook that contains in addition chapters on renal function and pyelography. The preparation of the book has entailed a great deal of work, notably frequent journeying by Mr. W. Thornton Shiells, the well known medical draughtsman, from London to Manchester in order to prepare the excellent cystoscopic paintings with which the volume has been generously illustrated. The opening chapters deal with the history of cystoscopy, the structure and optics of the modern cystoscope, and the technique of cystoscopy. In his preface the author acknowledges his debt to Mr. Schranz, of the Genito-Urinary Manufacturing Company, for help in dealing with the optics of cystoscopy; this difficult subject has been exceedingly well handled, just sufficient details being given to enable the reader to appreciate the construction of the cystoscope without being wearied with unnecessary technical points. Mr. Macalpine does not apparently consider it necessary for the cystoscopist to be in possession of a large number of different types of instruments, for he describes only the ordinary cystoscopes in general use. As, however, the work is primarily intended for surgeons whose opportunities for using the cystoscope are not sufficiently frequent to make them skilled in its employment, the decision to avoid describing instruments not in general use is perhaps a wise one. Nevertheless, it is an incontestable fact that certain regions of the bladder, and notably its neck, are more easily investigated by such instruments as Woolf's cysto-urethroscope than by the ordinary cystoscope. After describing the appearance of the normal bladder and the variations of the ureteric orifice which are commonly met with the author deals with pathological conditions. There is a description of the inflammatory conditions of the bladder and of the changes in the mucosa associated with this condition. Another chapter is devoted to a consideration of tuberculosis of the urinary tract; it deals with the diagnosis of the disease, the means by which a decision is reached as to the site of primary lesions, and methods of investigating the function of the unaffected kidney. Neoplasms of the bladder are described, and their treatment by per-urethral methods is discussed. Considerable advances have recently been made in cystoscopic methods of treatment, and it is perhaps a pity that the author has not mentioned some of the new models of cystoscope that have been introduced for the specific purpose of treating bladder growths. To deal with a large growth by means of diathermy applied through an ordinary catheterizing cystoscope is very difficult, especially if bleeding is occurring at the time of operation. In these cases such instruments as Woolf's irrigating cysto-urethroscope and Kidd's diathermy cystoscope are invaluable. Indeed, their use may be a vital necessity, and for lack of them it may be necessary to employ open methods. The omission of any mention of these instruments from Mr. Macalpine's description of diathermy of bladder growths is rendered more striking by the fact that in the following chapter dealing with vesical calculi he gives a description and illustrations of a cystoscopic lithotrite, an instrument few general surgeons possess. In an excellent chapter on stone in the ureter the author describes the use of the wax-tipped bougie, Buerger's dilating olives and scissors, and Bransford Lewis's ureteral dilator. The book concludes with a long chapter on pyelography, well illustrated by plates.

It is impossible to read Mr. Macalpine's treatise on cystoscopy without being impressed with the amount of labour expended on it, both by the author and by the draughtsman associated with him. In a book devoted to cystoscopy the quality of the illustrations and coloured plates is of paramount importance, and the fact that Mr. Thornton Shiells has been responsible for these is a guarantee of their excellence. Fortunately little has been lost in the process of reproduction, and author, artist, and publisher are all to be congratulated on the result. The surgeon who employs that important therapeutic weapon—the cystoscope—only occasionally, and even those who are more expert in its use, will find here much that is helpful.

ANATOMY OF THE CENTRAL NERVOUS SYSTEM.

PROFESSOR GEORGES GUILLAIN and Dr. IVAN BERTRAND have produced a notable volume in their *Anatomie Topographique du Système Nerveux Central*.[3] Working together in the laboratory of the Salpêtrière, they aimed at producing a book which should be of moderate size but of a wider range than the schematic textbook suitable for students. For this reason "schemata" or diagrams are avoided altogether, and the sixty fine plates which illustrate the work are all photographic reproductions of macroscopic and microscopic sections of the several parts of the central nervous system. The illustrations have been chosen with great care and with a view to rigorous

[2] *Cystoscopy.* By James B. Macalpine, F.R.C.S.Eng. Bristol: J. Wright and Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd. 1927. (Med. 8vo, pp. xvi + 234; 181 figures, 12 plates. 25s. net.)

[3] *Anatomie Topographique du Système Nerveux Central.* By Georges Guillain and Ivan Bertrand. Paris: Masson et Cie. 1926. (Imp. 8vo, pp. vii + 322; 60 plates. Paper cover, 80 fr.; bound, 95 fr.)

anatomical exactitude; they form the basis of the work. The text consists of descriptions of the naked-eye and histological anatomy as revealed by the plates, and physiological and clinical considerations have been omitted as the work is intended to be purely anatomical. It will prove of great value to house-physicians and others working systematically in the wards and laboratories of neurological hospitals, and for such it was primarily written; but the general physician also will find it a book which he will be glad to possess for reference as an authoritative guide in the elucidation of clinical cases and *post-mortem* appearances. Accurate anatomical knowledge is at the basis of neurological diagnosis and must precede physiological and clinical deductions in a sound neurological training.

The publishers have maintained their high reputation in the production of the plates, the printing of the text, and the binding, and the price for a volume of such a high standard is not unreasonable.

Messrs. Masson, publishers of so many classical French neurological works, have added to their series an admirable small volume on the *Anatomie Élémentaire des Centres Nerveux et du Sympathique chez l'Homme*,[4] by Professor P. GILIS of Montpellier. It is a straightforward account of the essential facts, and will be found of convenient size for the student and useful also in post-graduate classes, and for revision by physicians and teachers. A short account of the development of the nervous system is followed by a systematic description of the sensory and motor centres and tracts. The spino-thalamic tract is described after van Gehuchten as passing through the cerebellum, not directly through the brain stem to the thalamus: it is curious that the author should maintain this view, although it is abandoned in the second edition of the late Professor van Gehuchten's textbook. The account of the extrapyramidal nuclei and tracts is up to date and some guarded clinical deductions are made. A very full account, occupying half the book, is given of the autonomic nervous system. The author is anxious to emphasize the anatomical unity of the cerebro-spinal and autonomic nervous systems and, as far as possible, the description of both follows identical general lines. There are some excellent diagrams and one plate.

MALARIA: ITS INVESTIGATION AND CONTROL.

THE object of this book on *Malaria*,[5] by Major ROBERT KNOWLES, I.M.S., Professor of Protozoology in the Calcutta School of Tropical Medicine, and Mr. RONALD SENIOR-WHITE, malaria research officer to the Central Malaria Bureau, India, is explained in the preface as follows: "Numerous as are the existing books on malaria, there at present exists in India no suitable handbook which can be put into the hands of medical men of the assistant surgeon class to help them in their malarial problems." It may with confidence be said, however, that this monograph will be welcomed by a much larger audience. The chapters on the life cycles of the malarial parasites, the laboratory diagnosis, and treatment of malaria are by Major Knowles, while Mr. Senior-White is responsible for the chapters on malarial survey work and antimosquito measures.

The book is eminently readable and practical, and well illustrated, and the results of recent researches on malaria have found a place. All statements are submitted to a running commentary which assists the reader in assessing values and in noting the paths along which further investigations may go. It is impossible to deal at length with the several sections of this monograph, but it may be mentioned that the Sinton alkali-quinine method of treatment is advocated, and the general use of intramuscular injections of quinine condemned in no uncertain terms.

The later chapters on antimalarial work are full of practical points and important details, and upon such matters success depends. There are appendices on breeding places and distribution, specifications for engineering work, and keys to anophelines, both adult and larvae, in the Indian subregion.

[4] *Anatomie Élémentaire des Centres Nerveux et du Sympathique chez l'Homme.* By Professor P. Gilis. Paris: Masson et Cie. 1927. (5½ × 8, pp. 232; 35 diagrams, 1 plate. 20 fr. sans majoration.)

[5] *Malaria: Its Investigation and Control.* By Robert Knowles, Major I.M.S., and Ronald Senior-White. Calcutta: Thacker, Spink and Co. 1927. (7 × 10, pp. vi + 208; 29 figures, 6 plates. Rs.7/8.)

BINOCULAR VISION.

THERE are few who realize what an important part the faculty of binocular vision takes in work and in play. Those who do not possess the faculty may not consciously miss the possession, but they are aware of an incapacity to compete with their normal fellows in certain games and in forms of work. In no calling is the possession of this faculty of more importance than in flying. It has been ascertained that the chief risk of flying is landing, and that it is gravely accentuated where there is any defect of this faculty of binocular vision. The work of Flight Commander Clements and of some of the American Air Force surgeons has proved conclusively that the risks are inversely proportional to the degree of binocular vision. When it is highly developed judgement of distance and position is at its best and landings are well made; when it is poor, either by reason of congenital poorness or disturbed because of illness or fatigue, then judgement is weak and landings are apt to be crashes. There is no absolute standard for this faculty any more than there is for that of visual acuity. We arrive at an average standard and check each man's capabilities against that. By such tests it is possible to gauge the liability to risks amongst flying men. Clements used Harman's diaphragm test largely; with that instrument it was possible to make the eyes walk, as it were, on a tight rope, or if they failed at that to provide a plank, or a pavement, or a whole breadth of street for their balancing, and the control of eyes in these several conditions is as variable as bodily stability in these actual standings. Dr. KENNETH R. SMITH has been in the service of the Royal Air Force, and is therefore familiar with these facts. He has written an attractive little pamphlet[6] emphasizing these points, and believes that much may be done to remedy defects by definite exercises. He uses an instrument which is essentially Javal's bar-reading test. To a baseboard is fixed at one end a desk for printed matter or the like, the other end the observer places against the face; at a certain distance before the nose there is an extended post, which obscures for one or other eye corresponding parts of the print which are seen by the other eye where there is binocular vision. All these devices are useful as tests, and some of them are invaluable in showing patients where they fail. But we have some doubt whether practice with such instruments for a few minutes or even up to an hour a day (and they are too monotonous for longer periods) will alter an inborn incapacity which is dominant for all the rest of the day. We should have thought that any development that was possible would be best attained by assiduous practice at games such as lawn tennis; there is no doubt that high skill in this game only comes to those with perfect binocular vision, where hand and eyes are in such intimate and automatic association that the judgement is perfect. Golf for this purpose is useless; a one-eyed man can do most of the shots just as well as he who has the best binocular vision, perhaps better. Dr. Smith's little book is of interest and worth reading.

PRINCIPLES OF THE HUMAN ECONOMY.

WE have read a good many primers on human anatomy and physiology designed for different sections of the public, from school children to wives and mothers, but for the most part these have not greatly attracted us, either on account of their failure to convey instruction with few words or because they did not succeed in conveying to the mind something more than a mere catalogue of facts. But there is a book before us—*The Human Body*,[7] written by Dr. TREVOR HEATON, Dr. Lee's Reader

[6] *Some Facts about Binocular Vision.* By Kenneth R. Smith, M.D., late R.A.F. Service. Dimbleby and Sons, 14, King Street, Richmond, Surrey. 1927. (Pp. 24.)

[7] *The Human Body.* By Trevor Heaton, M.D. The Simple Guide Series. London: Chatto and Windus. 1927. (5½ × 8, pp. 250. 7s. 6d. net.)

in Anatomy in the University of Oxford—which does attract us, just because it is neither a catalogue of facts of elementary physiology and anatomy nor a bald narrative with no sense of the mystery of the human body within it. He has contrived to write one of the most fascinating books for the general reader that we have come across.

Dr. Heaton avows his purpose to be not so much to impart instruction as to awaken interest in a subject the approach to which is usually guarded by a ring-fence of technicalities. He intends his book to be readable, and to provide some slight commentary on a number of matters of health and disease which do not as a rule pass the limits of knowledge of Macaulay's schoolboy. Of his success there is no manner of doubt: his book is readable, for it is full of stimulating interest; not least commendable is the manner in which he has dealt with reproduction. For the most part books of this class leave the subject severely alone; either the authors dare not or they cannot write on the mystery of life. But here, in three chapters on the internal secretions, reproduction and development, and disease and death, there is a fine piece of writing, that at once raises the whole tone of the matter to a high level of dignity and impressiveness. Facts are there, but the facts are so related to their purpose that mere curiosity is swamped by marvel, and the general reader who turns these pages will certainly be the better for their perusal.

NOTES ON BOOKS.

Infamous Conduct,[8] by MEDICUS, is a tragic story of a well meaning, able, but highly strung medical man who settles down to build up a practice, and has a hard time at the hands of the medical men in the district, who resent his intrusion as a "planter." A footnote explains that a planter is a doctor who sets up a plate without first buying a practice from an already established practitioner. Almost every kind of minor misfortune happens to this unlucky man, who, being in financial straits, becomes medical adviser to a new medical club for insured persons' wives; the secretary and committee of the club, it is admitted to him, canvass and advertise in the papers, but he does not take in the significance of this until he is summoned before the General Medical Council to meet a charge of "infamous conduct in a professional respect," which so unhinges him that he commits suicide by taking prussic acid. The author hopes that this book will bring about revision of the terms of censure passed by the General Medical Council upon unfortunate transgressors. It has come to our notice that the publishers in their natural desire to push the sale of this novel have sent postcards to members of the medical profession bearing the ambiguous legend: "'Infamous Conduct' by Medicus. This book just published at 6s. is of special interest to you. You should order it to-day." Though, of course, there cannot have been any intention to connect "infamous conduct" with the recipient, it was surely ill-advised to send an advertisement so worded on a postcard, especially to a country village where gossip is always rife.

The little book entitled *Management and Administration of Estates in Lunacy*[9] has been revised and brought up to date. The matters dealt with are now arranged alphabetically, a change which will greatly facilitate reference. Since the first edition was published the Trustee Act, 1925, the Settled Lands Act, 1925, the Administration of Estates Acts, 1925, and the Law of Property Act, 1925, have all been passed. Additions and modifications consequent upon these Acts have been incorporated. Of medical interest are the affidavits which must be made by a medical attendant or medical superintendent of an institution when application is made for the appointment of a receiver. The book is concisely written and will be of value to those who are engaged in this special work.

A second edition[10] of Dr. R. FRANCK's handbook of recent pharmaceutical, physical, and dietetic treatment has been called for within a year, and this may have encouraged the publishers to send us a copy for review. The first part consists of a brief description in alphabetical order of drugs and proprietary preparations, followed by lists of mineral waters, prescriptions, tuberculins, serums, and antidotes for poisons, as well as patent foods and other proprietary preparations, the ingredients of which are stated. The second part is devoted to the treatment of medical disorders, arranged according to the various systems.

[8] *Infamous Conduct*. By Medicus. London: Henry Walker. 1927. (Cr. 8vo, pp. 285. 6s. net.)

[9] *Management and Administration of Estates in Lunacy*. By Gerald E. Miles, O.B.E., and A. H. Ronald W. Poyser, B.A., Barristers-at-law. Second edition. London: Butterworth and Company. (Demy 8vo, pp. 60. 7s. 6d. net.)

[10] *Moderne Therapie in innerer Medizin und Allgemeinpraxis*. By Dr. R. Franck. Second edition. Leipzig: F. C. W. Vogel. 1927. (Post 8vo, pp. vi + 626. M.15.)

PREPARATIONS AND APPLIANCES.

Modified Bozemann's Uterine Forceps.

MR. J. LYLE CAMERON, F.R.C.S. (London), has devised a modified form of Bozemann's uterine forceps which is, he states, a very convenient instrument for packing, or for making applications to the uterus, cervix, or vagina, or for introducing a drainage tube.

The improved forceps has the usual double curve and single catch rack, but the blades are rounded at the end, longer and slightly tapering from the joint, and cross serrated inside for one inch from the tip. The handles are longer, the entire instrument is stouter and stronger in construction, and since

it is made of stainless steel it is easy to cleanse and sterilize, and very durable. The round end, which is the size of a No. 5 uterine dilator, greatly minimizes risk of perforating the uterus or vagina; the taper admits of its use to some extent as a dilator; its cross serrations provide a ready grip for introducing or removing packing or drainage tubing, or for holding a pledget of wool when making an application; the greater length facilitates packing a large uterus and allows the hand to be kept out of the way; the stoutness of the forceps permits twisting when swabbing, painting, or cleansing the cervix.

Mr. Cameron adds that to the general practitioner as well as to the gynaecologist this should be a useful instrument—in conjunction with a Sims's or bivalve speculum, a vulsellum, a gauze roll or ribbon impregnated or not as required—when haemorrhage calls for quick and firm packing; also for painting or packing the uterus after curetting.

THE AMERICAN MEDICAL HISTORY OF THE WAR.

THE volumes in which the Medical Department of the United States Army is recording its activities during the war are planned on a very large scale; we have already given an account of some of them. They are not being published in numerical order. We received a few months ago the sixth and the fourteenth; the eleventh, which came to hand in August, will be noticed later; it is the first part of the section on surgery, and includes general and orthopaedic surgery, and the surgery of the nervous system.

The sixth volume has the title Sanitation.[1] It is of the same bulky character as the volumes previously published, and is in two parts, each occupying half of the volume. Part I, compiled by Colonel W. P. Chamberlain of the medical corps, contains an account of the sanitary and hygienic aspects of recruiting, camps, barracks, organization and administration of the military forces of the United States previous to their embarkation for service overseas. Part II, by Lieut.-Colonel F. W. Weed, deals almost exclusively with sanitary work in connexion with the American Expeditionary Force in France. We are warned in the introduction not to confuse the expression sanitary, as used in the American Army, with sanitation. The former term is employed in the continental sense, and must be interpreted to mean the army medical service generally. For example, the sanitary train of a division is the term used for the divisional group of field ambulance companies and field hospitals, and the sanitary corps is the corps of enlisted men for medical services corresponding to our R.A.M.C. Sanitation in its restricted sense was administered from the surgeon-general's office

[1] *The Medical Department of the United States Army in the World War*. Volume VI: Sanitation. Washington: Government Printing Office. 1926. (Super roy. 8vo, pp. 1141; 45 tables, 10 charts, and 94 figures in Part I, and 55 tables, 4 charts, and 148 figures in Part II. 3.25 dollars.) Vol. XIV: Medical Aspects of Gas Warfare (pp. 876, 37 charts, 15 plates, 242 figures. 3 dollars.)

in Washington by a sanitary inspection section, with a small body of itinerant sanitary inspectors numbering from four to eight.

RECRUITING.

The opening chapters of Part I contain much that is of value as a guide to officers whose duties involve the sanitary inspection of camps, units, barracks, hospitals, and other military institutions, and consist mainly of copies of forms for inspection reports, together with selected examples of some of the reports actually submitted. The forms are of a very exhaustive character, and there must have been a vast accumulation of such reports in the surgeon-general's office. How far the recommendations of the inspectors were or could be carried out is another matter, for it would appear that the frequency of inspection was never up to the desired standard, owing to the difficulty of obtaining a sufficient number of experienced and otherwise qualified officers for inspection services. The remaining chapters of this part of the volume deal with the usual subjects of military sanitation in the home territory, and with the physical examination of men on enlistment and on demobilization. All these subjects are treated in the detailed and documented manner which is characteristic of the United States medical history of the war, but is somewhat tiresome for general reading. Copies of forms, official memoranda, correspondence, and so on, occupy a considerable portion of each chapter, and are, of course, of value historically and for educational and administrative purposes, but scarcely appeal to readers outside the United States medical service. It may be of interest, however, to note that the minimum physical standards for enlistment for men 21 years of age and upwards were 64 inches in height, 30 inches with 2 inches mobility chest measurement, 128 lb. in weight, and 20/40 vision in right eye and 20/100 in left; these standards, after June 5th, 1918, were lowered to 60 inches height, 110 lb. weight, with auditory acuity from 20/20 in each ear to 10/20. The dental requirements, which at first were four serviceable opposing bicuspids or molars, were increased to six, and six incisors or cuspids (canines?) were also necessary. Recruits were classified in four groups: group A being men fit for general service; group B men fit after a remediable operation; group C men fit for special or limited service in a definite occupation; and group D men unfit for any service. Many difficulties arose with those men of group B who refused to undergo a remediable operation, as well as with those awaiting operation. Great numbers of the latter filled camps, barracks, and hospitals, occupying accommodation urgently required for group A men. The policy of having a deferred remediable class of recruit was consequently vexatious and a source of much trouble and controversy. It was eventually abandoned, and remediable cases remained in the army without operation or were discharged. The statistics of demobilization medical examinations are also interesting, although they are somewhat involved and incomplete. Four million are said to have been examined on demobilization. During the period November 11th, 1918, to December 31st, 1919, of these the number medically examined and the results reported was 3,133,921. As many as 2,936,780 were shown as discharged without any disability. The magnitude of the work undertaken by the American medical boards in this connexion is worthy of notice.

PREVENTION OF DISEASE.

The second part of the volume, dealing with sanitation in the American Expeditionary Force in France, is of the same detailed character. Only two diseases—epidemic diarrhœa and epidemic influenza—are stated to have developed sufficiently to cause excessive sick rates. Details are given of the organization for the prevention of communicable disease, such as delousing measures, disinfection of clothing, and destruction of rats; the measures employed were, as a rule, similar to those in force with the British armies. The same remark applies to the various measures of sanitation in connexion with purification of water supplies, disposal of waste products, shelters for troops, and so on. The well known depoisoning and chlorinating plant designed for use with the British troops was apparently copied by the Americans, although there is no acknowledgement of the great value our experience and sanitary methods were to their troops and medical services in France. They coined a name, "sterilab," to designate this plant. It reminds us of the habit of the Japanese to concoct a new Chinese ideograph to designate a new invention. Details are given of the clothing and equipment of the U.S.A. infantry soldier, and of his rations. A weight of 50 lb. is regarded as the maximum that should be carried by a man weighing 144 lb. The U.S.A. soldier's equipment and arms varied from 61 lb. to 73 lb., with an additional 18 lb. for clothing worn on the person. The Americans, however, were not called upon to make long marches, and there is no record of breakdown from carrying these excessive weights. The field ration was of high calorie value. At first it had a value of 4,871 calories, but this was reduced to 4,258 in 1918. Even then it was considerably higher than the allied and enemy field rations.

An interesting account is given of a mobile laundry, which was designed in the United States and shipped to France. The illustrations and details of this important unit are worthy of study. It is a new form of unit, the need of which was much felt by our armies in the field. Only four were shipped between June 5th and October 15th, 1918, but large numbers were ready for shipment by the time of the armistice.

One of the fullest chapters in the volume, a chapter of some hundred pages, deals with the prevention of venereal diseases amongst the American troops in France. A graphic description is given of the state of affairs at St. Nazaire, the chief port of disembarkation, where the American authorities came into conflict with the French over the question of putting licensed brothels out of bounds. The French authorities feared that the effect of this measure would be to increase clandestine prostitution and disseminate disease amongst the French women, especially as it had come to notice that a considerable percentage of the American troops on disembarkation were found to be suffering from syphilis or other venereal diseases. Full details are given of the correspondence that took place on this subject. Among other suggestions by the French authorities was that at least three licensed houses should be open for American coloured men, or that coloured women should be sent over for them from America; or that, failing acceptance of these suggestions, all coloured men should be sent back to the United States. None of these suggestions were accepted, and reliance was placed on the well known prophylactic centres that were established by the Americans in France.

The size of the volume and the mass of information it contains do not permit of any extensive culling of other interesting points, and we can only express our admiration of the care which characterizes the compilation of this history and its excellent series of illustrations.

CHEMICAL WARFARE.

Volume XIV, which has been published recently, transcends anything that has yet appeared in one volume on the medical aspects of gas warfare. Although it deals with the problems presented by this new weapon only so far as they concerned the medical department of the United States Army directly, or through affiliation with its chemical warfare service, it constitutes a record of great scientific value, and is of exceptional importance in connexion with the organization of the services of gas defence and the treatment of gas casualties. Early in the war the United States military authorities realized the seriousness of this new weapon; and in the introduction to the volume emphasis is laid on the fact that the employment of poison gases was one of the most important military developments, and that no innovation since the introduction of gunpowder has revolutionized warfare to the same extent. So seriously did the American General Staff regard it that by the end of the war the United States machinery for the manufacture of poison gas was producing nearly double the combined output of Germany, France, and England. More than 10,000 men and women were employed in the chief factory, in addition to those employed in nine other factories throughout the States. At the time of the armistice 140 tons could be turned out daily; and in contrast with this it is stated that, while

Germany was manufacturing 50 tons daily when it started chemical warfare, its power of production gradually decreased, owing to economic conditions, and that at the time of the armistice it could produce only a fourth of that amount.

The volume tells us the history of the activities of the medical department, in connexion with the defensive measures against the new weapon, in three main sections and twenty-one chapters. The first section of four chapters deals with the organization and administration of gas defence; the second, also of four chapters, with the clinical features of gas poisoning; and the third, forming approximately half the volume, with experimental research.

The chapters of the first section, a comparatively short one of eighty pages, are of chief interest from a military medical point of view. They deal with the organization for gas defence in the United States, and with the American Expeditionary Force in France; the classification and methods of use of war gases; and the field arrangements for gas defence and for dealing with gas casualties. As early as November, 1915, the military authorities in Washington decided that the duty of providing defensive equipment against poison gases, in the event of its being needed, should be assigned to the medical department, and the Surgeon-General consequently appointed two medical officers to act as observers in France. Eventually, in May, 1917, he was definitely instructed to supply during the period ending June, 1918, a million gas masks, 8,500 sprayers, and 1,000 oxygen apparatus. A field supply section, an overseas repair section, and a training section for gas defence were then organized under Lieut.-Colonel W. P. Chamberlain of the Medical Corps, to whom an establishment of 144 officers and 687 other ranks was allotted. A large number of British gas expert officers arrived in Washington in November, 1917, under Major Auld of the British Military Mission, and were posted to the training section. In February, 1918, the whole of the training section was handed over to the engineers of the National Army, and in July of the same year a chemical warfare service was organized, to which the whole personnel, administration, and organization of gas defence were transferred from the medical department. In this respect the development of gas defence in the United States followed much the same course as in the British Army.

A feature of the United States organization in the field was the appointment of a medical gas officer to each division, although none was actually appointed until the end of June, 1918, and it was not till October that all the divisions had their medical gas officers. The duties of these officers were to institute measures for instructing and training medical personnel in handling gas casualties and the rank and file in first aid; to direct the work of mobile "degassing" stations; collect and forward pathological specimens to the army laboratory; and generally control the management of gas casualties from the commencement of gas attacks until all had been degassed and disposed of. In each division, according to its position in line, in a quiet sector or in a back area, one of its four field hospitals was assigned for the reception and sorting of gas cases, or for slightly gassed and convalescents, or as a reserve in case of a gas attack. A scheme for sending two emergency gas teams, consisting of an officer, two nurses, and two orderlies, from each base hospital to these field hospitals did not materialize, as it was strongly opposed by the chief surgeon of the First Army, who considered that the resources of the army were sufficient without them, and that a field hospital was not a suitable place for female nurses. A plan for allotting to each corps three mobile hospitals of 1,500 beds each as gas evacuation hospitals was also not carried out, but a provisional army gas hospital was established at the end of August, 1918. Eventually five such army hospitals were allotted for the reception of gas casualties, with 200- to 550-bed capacity. Medical services were also employed in an experimental gas establishment near Chaumont.

Five pages only are given to the chapter on the classification and use of war gases, and the remaining chapter of the first section of the volume is a reproduction of the reports of divisional and other medical gas officers, together with a history of the office of the medical director of the chemical warfare service with the United States Expeditionary Force, Lieut.-Colonel H. L. Gilchrist, who had spent some time studying defensive gas measures in the British gas school at Rouen. A useful plan of a degassing gas tent and an account of its organization and employment are given in this chapter. There are some interesting statements regarding self-inflicted gas burns and malingering. The United States mortality from gas poisoning was 1.7 per cent. of the cases treated, as compared with 3 to 4 per cent. in the British and French armies. This cannot be attributed, says the report, to better treatment, but was "due wholly to the fact that a large number of reported gas casualties were suffering from other causes." In one field hospital a board of medical officers examined 281 cases under treatment for gas poisoning. They found that only 90 had actually been gassed, and the others were returned to duty. "Many men," the report goes on to state, "have claimed they were gassed in order to get out of the first lines," and again, "it is believed, if the true facts were known concerning our gas casualties, that they would not be over one-third those actually reported."

The second section of the volume on the clinical features of gas poisoning records much the same facts as the corresponding chapters in the *British Medical History of the War*. The greater part of the section, however, is a detailed statement of 107 necropsies on men who died from gas poisoning, illustrated with many coloured and other macroscopic and microscopic specimens. It concludes with a chapter on statistics of gas casualties, in which we are told that 70,552, or 31.49 per cent., of the 224,089 battle injuries in the United States Army were due to gas; and that 1,221, or 8.92 per cent., of the 13,691 deaths from those under treatment for these injuries were attributed to the effects of gas. Of the gassed cases, 27,711 (599 deaths) were from mustard gas, 6,834 cases (66 deaths) from phosgene, 1,843 (7 deaths) from chlorine, and 577 (3 deaths) from arsene poisoning. The nature of the gas in 33,587 cases and 546 deaths was not reported. These figures demonstrate the remarkable protection eventually provided against chlorine, for, when chlorine gas was first let loose against us in April and May, 1915, it is estimated that fatal results occurred in 5 per cent. of the cases under treatment, as compared with only 0.38 per cent. in the United States Army in the later years of the war after protective measures had been fully developed. An analysis is made of the after-results in 3,014 gas casualties, from which it appears that 54.34 days was the average period of treatment in hospital, and was greater in mustard gas than in chlorine or phosgene cases; 79 of the 3,014 cases had died, but only 30 of these deaths were obviously due to the effects of gas. They occurred within ten to thirty days after the attack, except in three single cases (after 61, 1,137, and 1,955 days respectively). Of the 30 deaths, 24 were from the effects of mustard gas. The incidence of pulmonary tuberculosis after gassing was studied, but the conclusion was that there was no evidence to show that the death rate from this disease in the United States had been in any way affected as the result of gas poisoning during the war.

The remaining section of the volume fills some 400 of its 876 pages. It consists of an account of the experimental researches in gas poisoning by various workers in the United States, only one of its thirteen chapters being devoted to the work of the experimental gas establishment in France. The section is, however, of great pathological interest, and is elaborate in its details of experiments on animals and human beings with various gases. An appendix of some seventy pages contains a statement of the gas defence equipment supplied, an account of interallied conferences and lectures given in Paris to the divisional medical gas officers, and other details.

As a book of reference on the defence aspect of chemical warfare the volume has no equal in medical literature. Its practical value to the military medical services will be found in the comparatively short first section. It is beautifully printed and illustrated; and its price, 3 dollars, makes us wonder how a volume of its size can be published at so small a cost.

British Medical Journal.

SATURDAY, SEPTEMBER 24TH, 1927.

WINDOW GLASS SUBSTITUTES AND SUNLIGHT THERAPY.

THE Council on Physical Therapy of the American Medical Association has issued recently a valuable report[1] on tests of new window glass substitutes for which the claim is made that they allow the passage through them of the short wave-lengths of light forming the ultra-violet end of the spectrum. Four kinds of material were tested: vitaglass and corning glass, which are said to be true glasses; celoglass, composed of wire-mesh screen filled with an apparently celluloidinous preparation; and flexoglass, a thin, rather loosely woven cloth treated with a paraffin-like substance. Four tests were employed. The first was photography of the spectrum for clear glass; this at once shows the length of the spectrum transmitted. But as this is only useful for plain glasses, other methods had to be adopted for crinkled glass, since this scatters the rays. For testing crinkled glass a modification of the Hilger monochromatic illuminator was used. Into the eye-piece of the instrument a thermopile was inserted connected with a delicate galvanometer, and the material to be tested was inserted within the eye-piece close up to the thermopile, so that scattering effects were negligible. Further, a new instrument, the pyrheliometer (fully described in the report), was employed to obtain continuous records of the intensity of the sunlight in connexion with the biological tests. This instrument is so sensitive that with it diffuse light can be measured as well as direct sunlight, and when used in connexion with a special amplifying unit it is sufficiently sensitive to measure the variations of twilight.

In the biological tests chickens were used, because experience has shown that they are well suited for an investigation of this kind. Chickens react to an environment deficient in ultra-violet rays. They suffer from a leg weakness which is like, if not identical with, mammalian rickets. The chickens were housed in the same laboratory; feeding was identical and controlled. Six groups of birds were tested with different lighting—some with the special glasses, others with ordinary window glass. The condition of the epiphyses was determined by radiograms. With some of the birds exposed to ordinary window glass the well known characteristic posture of the rachitic affection was obvious even a week before the *x*-ray photographs were taken; those exposed to the special glasses escaped.

The results of the investigations encourage the belief that materials for glazing windows are now available which do not possess the fault of ordinary window glass in excluding the health-giving rays of sunlight. This belief (the report states) is particularly engendered because in the biological tests the cages did not have a southern exposure, and they were, moreover, of such a size that the chickens were not compelled to remain in the sunlit area. A comparatively small amount of exposure to sunlight, even during the winter months, at the latitude of Boston (42° 22′ N.) has a decidedly beneficial effect. Corning glass and the clear vitaglass are as transparent to the visible rays as window glass. Celoglass and flexoglass, on the other hand, are not transparent, but the data furnished by the experiments show their comparative value for use in solariums and for animal rearing in cases where transparency is not essential. Both these substances are less expensive than ordinary window glass, but flexoglass is more affected by atmospheric changes than celoglass. The waxy coating of the flexoglass has a tendency to soften in hot sunshine, and dust may then adhere which is not easily washed off.

This feature—the effect of dust—incidentally mentioned in the report, is a vital factor in the success or failure of any special glass or glass substitute. It will be remembered that efforts were made not long ago to persuade the London County Council to use one of these types of glass for the classroom windows of the county schools. The proposal was negatived owing to the belief that the installation would be of no effect. Windows in London are so speedily grimed with dust, both within and without—within from the heating apparatus and without from the smoky atmosphere—that daily cleaning would be needed to preserve the special properties of the glazing material. So that, however effective these new glasses may be in permitting the transmission of beneficial ultra-violet rays, town dwellers cannot hope to reap any advantage from their use until such time as the campaign for smoke abatement has won substantial success. For the stock-breeder in the country they are available, but he has at his disposal unlimited command of such sunlight as falls upon these islands if only he will not pen up his beasts and birds in buildings during the hours of daylight.

[1] Physical Therapy. Report on Window Glass Substitutes. *Journal of the American Medical Association*, 1927, vol. 88, No. 20, p. 1562.

PSYCHIC BACK NUMBERS.

WHY among the higher mammals the degree of intelligence varies so greatly is not very easy to explain. Essentially it must be due to heredity and the primary urge or impetus peculiar to the species. It is doubtful whether the subject can, or ever will, be taken any further, but it is legitimate to ask what are the associated biological conditions. According to Professor Fleure, the astonishing superiority in intellect of man over other mammals is in part brought about by the long period of pre-natal life. He even believes that the increase of man's intelligence which has occurred comparatively recently when measured in geographical time is related to a lengthening of the period of gestation from 220 to 280 days.[1] This extension, he suggests, has made possible a greater growth of brain before birth, while the delay in the hardening of the skull permits an increase in the cerebral volume during infancy. Dr. Emile Devaux, who has recently[2] returned to a discussion of the psychic backwardness of the higher vertebrates as compared with man, calls these latter *arriérés psychiques*, which may, perhaps, be roughly translated as psychic back numbers. To explain their inferiority of brain, despite in some instances apparent superiority of organization, Dr. Devaux points out that in all such animals either the muscles or the digestive apparatus are voluminous. To achieve this increase in volume a vast supply of blood is necessary; and the determination of the blood supply to the muscles or digestive organs leads to a comparatively poor supply to the brain. The cerebral cells cease to multiply as soon as

[1] *Nature*, 1927, vol. 118, p. 380.
[2] *Revue Scientifique*, 1927, No. 2, p. 36.

their function is fixed; so that for large brain development the organism requires, in Dr. Devaux's opinion, as in Professor Fleure's, a long period of intrauterine life combined with a long quasi-larval existence, as in man. In illustration of his views, and to explain certain apparent contradictions, Dr. Devaux sets himself to answer the following questions: Why is the tiger not more intelligent than the cat? Why is the dog more intelligent than the sheep? Why is not a bird more intelligent than man? Why is the elephant inferior to us in intelligence? It is unnecessary to go into the arguments used by Dr. Devaux in answering all these questions; it will be sufficient to take the case of the elephant, which enjoys an intrauterine life of eighteen to twenty months, does not reach adult life until 22 or 24 years of age, and at first sight, therefore, ought to be more intelligent than man. In the elephant the association of ideas attains a complexity which seems to surpass even that of a dog, and its memory is remarkable. Nevertheless, its cerebration is infantile, and for these reasons, says Dr. Devaux: it is exclusively a vegetarian feeder; its osseous and muscular structure is gigantesque; it has an hypertrophy on its face. Evidently Dr. Devaux is no vegetarian, since he states that animals living on vegetable foods, which are longer of digestion, have on this account to ration the supply of blood to their brains. Consequently the carnivorous dog is almost as intelligent as the elephant and far more intelligent than the sheep, notwithstanding the mere sixty-three days of its gestation and the comparatively short period of puppyhood. When to its vegetarian habits we add the enormous bulk of the elephant and the prodigious development of its nose, we have quite enough to account for the insufficient supply of blood to the brain which has prevented the elephant from attaining the human standard of intelligence. Dr. Devaux's conclusion is that different syndicates of cells in the organism are in continual conflict on the subject of blood supply. This conflict in certain cases places the organ of thought in a state of functional impotence as the result of defective nutrition, and thus explains the poverty of intelligence in animals which seem more favoured than we are in other directions of organization.

Dr. Devaux was moved to write his article, apparently, because of a remark of Pierre Delbet that one of the advantages of transformism is the possibility it offers of explaining the origin of the huge development of the human brain. For this reason it may not be out of place to refer to the argument of Professor C. Lloyd Morgan, in a paper read earlier this year to the Aristotelian Society on emergent evolution.[3] There is something of the nature of a boom in emergent evolution at present; and Dr. William Brown, in a recent lecture at Oxford, invoked its aid in proof of the existence of God. Professor Lloyd Morgan is concerned to show that, while he claims that some evolution is by discrete or emergent advance, each step introducing something new, he does not deny the existence of resultant evolution. In resultant advance, says Professor Lloyd Morgan, the conditions are such that there is homogeneous continuity. In biology the "mechanist" says that all processes and products, from first to last, from the not-living to the living organism, are susceptible of resultant interpretation, and that further research will in due time resolve problems which to-day present difficulties. The believers in emergent advance find that there are modes of "behaviour" in the clustering of events within the living organism that are not deducible from that which obtains in the not-living. Their attitude is: "Resultant advance in plenty—as much as can be proved; but not a few residual matters which bear witness to emergent advance." Professor Lloyd Morgan fears that the concept of emergence may lead to wild use of the phrase as a popular catchword, and instances the possibility of people talking of the emergence of the elephant or the mongoose, and the emergence of polymorphism in ants. He endeavours to make his meaning clear by suggesting that biological inquiry includes both natural selection and genetics; that natural selection as such deals with variants; that some variants are weeded out in the struggle for existence, leaving others to survive; that such an elimination is a resultant effect; that the origin of variations is a subject for genetics; and that this or that variant may be the outcome of either resultant or emergent advance. It may be, therefore, that Professor Lloyd Morgan's hypothesis can assist in answering Dr. Devaux's question: Why is an elephant inferior to man in intelligence?

Dr. Devaux, in discussing his question, Why is the dog more intelligent than the sheep? speaks of the unequal strain imposed on the organism by different diets; and he attributes in part the stupidity of the sheep as compared with the dog to the fact that digestion in a carnivorous animal is finished in twenty-four hours, while a herbivorous animal requires three or four days, according to one authority, or even eight days according to others. The small intestine of the dog is only three times the length of the body, that of the sheep twenty-eight times; and, in Dr. Devaux's argument, the blood supply differs correspondingly in profuseness. A study by Dr. William A. Thomas of Chicago[4] of the Eskimos of Northern Labrador and of Greenland has some bearing on the points we are considering. He made his investigations in the course of the MacMillan arctic expedition of 1926, and has given to his report the title "Health of a carnivorous race," although only the Greenland Eskimo now lives entirely on meat; he has no available source of vegetable food. Dr. Thomas was chiefly concerned in making a cardio-vascular and renal survey of the people. He did not find evidence of any excess of renal or vascular disease in this meat-eating race. Moreover, the Greenland Eskimo derives sufficient vitamins from his food to protect him from scurvy and rickets. In Labrador, however, contact with civilization has led to a distressing condition. As wood is abundant, the inhabitants have learnt to cook their food. Moreover, the Moravian missions and the Hudson Bay Company, with the best of intentions, sell to the natives such provisions as dried potatoes, flour, canned goods, cereals, and cereal products. Dr. Thomas says that scurvy, rickets, and scurvy rickets are consequently universal; in children the gums are black, the teeth drop out, and there are haemorrhages of the skin and mucous membranes. In adults there are rheumatic pains, stiff joints, and fatigue. Notwithstanding months of constant sunlight, rickets seems almost universal. Except for these diseases, introduced by civilization, the Eskimos are a healthy race, leading a life of great physical activity, and constantly exposed to great dangers and hardships. We have no reason to suppose that the small intestine of the exclusively meat-eating Eskimo is shorter than the intestine of a vegetarian; but it is interesting to learn that a race can be so healthy on a purely meat diet. We learn also that, in some cases at all events, the introduction of a diet in part vegetarian—especially of the canned variety—is not unattended with risk.

[3] *Nature*, vol. 119, p. 786.

[4] *Journ. Amer. Med. Assoc.*, May 14th.

SIR JOHN GOODWIN.

THE Queensland Branch of the British Medical Association entertained Lieutenant-General Sir John Goodwin, K.C.B., late Director-General of the Army Medical Service, to dinner on June 16th, three days after his arrival in Brisbane to take up his appointment as Governor of Queensland. Dr. H. V. Foxton, the president of the Branch, was in the chair, and 104 members were present. In proposing the health of Sir John Goodwin, Dr. Foxton voiced the gratification of the Branch at his appointment as the representative of the King. Sir John Goodwin, in reply, expressed his thanks for the very hearty welcome given to him, both as a fellow medical practitioner and as Governor. He said that he looked forward with pleasure to his term of office, and keenly appreciated the kind reception he had had from the members of the Branch. Apart from his official work in Queensland, he added, he was still greatly interested in medical work and in the activities of the British Medical Association, of which he was a member. He would support the interests of the medical profession so far as it lay in his power, and do what he could to assist those of the Queensland Branch.

INJECTION TREATMENT OF VARICOSE VEINS.

A GOOD deal of interest has been shown by general practitioners in the comparatively new method of treating varicose veins by the injection of sclerosing substances. For those wishing to pursue the subject further a small work has now been written by Dr. A. H. Douthwaite,[1] who briefly described the method in our issue of September 25th, 1926 (p. 554). In his preface the author says that, with the exception of certain conditions which are detailed, he knows of "no varicosity in the limbs or anal canal, no matter how severe, which will not respond to the sclerosing effect of a suitably chosen solution." The advantages claimed are that post-operative embolism and the discomfort of a general anaesthetic are avoided, and that the treatment is ambulatory and there is no loss of time to the patient. The method owes its inception chiefly to French workers, among whom the names of Sicard, Gaugier, and Génévrier are most prominent. Various solutions have been tried, chiefly sodium salts, including the carbonate, citrate, and salicylate, as well as such substances as biniodide of mercury, glucose, iodine, and solutions of quinine salts. Dr. Douthwaite's experience is based on the neutral hydrochloride of quinine, of which he has now given over 2,000 injections. He employs for preference the following formula: quinine hydrochloride 4 grams, urethane 2 grams, distilled water 30 c.cm. This can be boiled, and possesses strong antiseptic properties; 1 c.cm. is injected on the first occasion to test the susceptibility of the patient to quinine, and 2 to 3 c.cm. can be used at subsequent sittings. The patient is placed in a suitable position to distend the veins, and the skin cleansed with spirit. The needle is inserted into the vein, and 1/4 to 1/2 c.cm. is injected, and the process repeated two inches farther up the limb. The immediate effect is to produce a slight transient cramp and swelling of the vein. Subsequently some aching and tenderness may be felt, but this is dissipated by movement. Bruising from leakage at the site of puncture may occur. The quinine may be tasted by the patient immediately after injection, and in those possessed of an idiosyncrasy tinnitus may follow. Fainting, giddiness, and griping hypogastric pain may be felt if menstruation is proceeding. Ague may be precipitated in malarial patients. The local effect of these solutions is to cause irritation of the endothelium of the vein, followed by clotting, but it is claimed that this "chemical clot" is firmer and more adherent, with less tendency to detachment. As contraindications are cited: pregnancy (quinine in particular should never be used); old or recent phlebitis, in which injection may light up the infection; and heart disease with imperfect compensation. Injections are inadvisable in cases of renal disease, uterine fibroids, or during menstruation. The method is simple, and the results so far recorded are excellent. Whether they will be as good when the method comes into general use it will be interesting to see. Those intending to use it would do well to see it carried out before trying it. Criticizing the method from a purely scientific view, it would seem that more investigation is necessary. It is said that this chemical clot is firmer and more adherent than the septic clot. What we would like to see are microscopic sections of its life-history, its formation, its extent, and time of its resolution. Does the end of the clot form a solid plug, or does it tail off? The fact that quinine can be tasted in some cases immediately after injection suggests some patency of the clot in the deep veins or in the main radicle, and the question arises whether, after repeated injections, the effect remains as local as is indicated. The vogue of the transparent silk stocking has given a great impetus to this form of treatment, and it is to be hoped that those intending to employ it will first master its principles; otherwise we can foresee some awkward complications following its use by inexpert hands.

[1] *The Injection Treatment of Varicose Veins.* By A. H. Douthwaite, M.D., M.R.C.P.Lond. London: H. K. Lewis and Co., Ltd. 1927. (Cr. 8vo, pp. viii + 38. 3s. net.)

ANNUAL REPORT OF THE MINISTRY OF HEALTH.

THE eighth annual report of the Ministry of Health has now been published in a separate volume, and supplements the report of the Chief Medical Officer of the department, to which we have referred at some length in our last two issues. While the present report follows for the most part the lines of its predecessors, changes have been made in the order in which public health services are dealt with. The subjects treated include, under the heading of public health: international health work; general health questions, such as mental deficiency, registration of nurses, and voluntary hospitals; sanitary administration; the inspection and supervision of food; infectious diseases; maternity and child welfare; supervision of the blind; housing; and town planning. Local government and local finance are considered at some length, and sections are devoted to the administration of the Poor Law, National Health Insurance and contributory pensions, and the Welsh Board of Health. Most of the matters treated in this report have been dealt with in official publications, noticed by us on various occasions during the year, but a new feature in the present issue is a valuable retrospect of the principal changes in the organization and development of services since the Ministry of Health was established in 1919. This affords an interesting survey of the administrative procedures which play an important part in the improvement of the public health. Accounts are given by general inspectors of the local administration of the Poor Law during the year—a revival of a former practice. The Report of the Ministry is published by H.M. Stationery Office at the price of 5s. net.

ALCOHOL AND THE LEAGUE OF NATIONS.

THE question whether alcoholism has an international aspect which properly brings it within the sphere of the League of Nations led to one of the most spirited discussions of the present Assembly in Geneva. The proposal to make the alcohol problem the subject of study by the League was brought forward by the Foreign Ministers for Belgium, Denmark, Czechoslovakia, Finland, Poland, and Sweden. They based it upon the fact that many States had been obliged during the last few years to take energetic measures to prevent the smuggling of alcohol over their

frontiers, so that the need for international agreements in this matter had been felt; further, that the taking up of this question would be a logical sequel to the work already done by the League in respect to the traffic in alcohol in mandated territories and to the protection of women and children. In the work on this latter subject alcoholism and prostitution have been found to be largely interdependent. The chief opponent of the proposal was M. Loucheur, the French delegate, who, while describing "the joy and radiance bestowed by good wine," nevertheless betrayed his anxiety lest the impression should get abroad that France was pro-alcohol. M. Loucheur grew almost lyrical in praise of the wine when it is red, and, while professing respect for water drinkers, declared that his respect was quite untinged by envy. It was during this eulogy that the President, making a sudden gesture, upset the water-bottle on the table before him, and drenched those in the vicinity. The delegates for Portugal and Italy, also wine-producing countries, warmly supported their French colleague, but Mlle Rosenberg, delegate for Hungary, and president of the National Council of Hungarian Women, said that the fact that her own country produced tokay would not prevent her from supporting strongly the action now proposed, and she put it forward as an ascertained fact that women who took a glass of wine a day were unable to nurse their babies. But "the noes had it." The Australian delegate, the Hon. T. J. Ley of Melbourne, claimed that alcoholism could on no account be brought within the Covenant of the League. If the plea was made that, because the occasional abuse of drink produced disease, alcohol came under Article 23 ("the League will endeavour to take steps in matters of international concern for the prevention and control of disease") why should not milk come within the scope of the League, since impure milk caused tuberculosis, or tobacco because excessive smoking caused nicotine poisoning? On the other hand, said Mr. Ley, if the proposal came forward as an extension to all and sundry of the action which the League had taken on behalf of native races in mandated territories, he thought it was even less justifiable. He also emphasized the point that prohibition in several countries was still in an experimental stage, and that action by the League at this juncture would spoil the progress of a social experiment as well as interfere with the liberty of the State. The Hon. Philippe Roy of Canada said that a wave of prohibition had at one time threatened Canada, but all the provinces, except Prince Edward Island, had reverted to "wetness." He could not support the proposal, especially if it included wine, which as a doctor he considered a form of nourishment and not a poison. Professor Burckhardt, the Swiss delegate, urged that, while the League was not required to act in such a matter under the terms of the Covenant, there was nothing to prevent it so acting, but any action must be at the unanimous desire of the members, which was certainly not forthcoming. Dr. W. E. Elliot, M.P., the British representative, suggested that the proposal be withdrawn and submitted in a new form to a subsequent Assembly, and eventually the proposers, headed by the Foreign Minister for Sweden, agreed to this course. Evidently even such a modest proposal as to set up a League committee to study this subject and collect information brings unsuspected lions from their lairs.

DEFICIENCY DISEASES.

THERE is a tendency to consider that deficiency diseases are almost synonymous with avitaminosis. Recent experimental work on farm animals has shown, however, that not only is this far too narrow a view to take, but that, in fact, disease may be due to deficiency of certain inorganic salts—salts of iron, iodine, manganese, calcium, phosphorus, and so on—minute quantities of which are essential for the well-being of all animal organisms. Thus certain tracts of valuable grazing land in New Zealand are useless owing to the lack of iron in the soil. Sheep pastured on these areas show signs of anaemia, develop lameness, and become emaciated owing to this single deficiency. This can be seen in all parts of the world. One of the most striking examples, however, has been found in the Union of South Africa,[1] where two serious conditions of cattle—"lamsiekte" and "styfsiekte"—have long puzzled the local authorities. Recent investigations at Onderstepoort Veterinary Research Institute by Sir Arnold Theiler and his colleagues have shown that both may be traced directly to a lack of phosphorus. The latter disease is, in fact, due to this condition alone, and so is a true deficiency disease. Lamsiekte, however, is rather different. It is the name originally given by the South African pioneer farmers to a fatal disease of cattle characterized by symptoms of paralysis and paresis, principally of the locomotor system. The first clue to its causation was discovered by Sir A. Theiler in 1915, after observing a natural infection following the deliberate ingestion of skeletal carcass debris. Experimental feeding with the same debris produced the disease, and the idea of a toxicogenic saprophyte was at once considered. This was found to be a specific anaerobic bacillus, *Parabotulinus boris*, closely related to the well known *Bacillus botulinus*. The next step was an inquiry into the cause of the depraved appetite (osteophagia) which impels the animal to eat carcass debris which it would otherwise shun, and this was found to be due to the phosphorus-deficient vegetation causing a phosphorus starvation in the cattle. Both can be entirely eliminated by the addition to the food of substances—such as bone-meal—rich in phosphorus, a proceeding which not only causes quickened growth in young animals, but a considerable increase in the milk production in adults. These cases only indirectly affect human medicine, but their fundamental importance is very great, as great probably as the discovery of vitamins a few years ago.

A LINK.

HARRY BURRELL has written a delightful book, full of illustrations, on *The Platypus*[2] (Ornithorhynchus). He has been on terms of intimacy with the animal for a period of twenty years, is well acquainted with its ways, and has written its biography in a manner which evokes a more lively interest than that derived from the contemplation of our dried and bottled specimens. Introduced to science in 1799 by Dr. George Shaw, the first specimens to reach Europe were looked on with suspicion; coming, as they did, by way of the Indian seas, there was an inclination to class them with Eastern mermaids and other works of art of the crafty Chinese. When this prejudice was overcome the animal formed material for controversy among the bigwigs of science for nearly a hundred years. Being a furry animal it should, by rights, be a mammal; but Shaw had stated that it laid eggs, and Home discovered that it had no nipples. The St. Hilaires in France thought it laid eggs; while Richard Owen considered that it produced eggs which were hatched within the body. Meckel, who discovered that mammary glands were present, held that the young were born alive, and Blainville held the same view. Blumenbach, from an examination of the skull, concluded with singular penetration that the animal laid eggs. Finally Caldwell settled the question by observing a female platypus in the second stage of parturition with the egg in the act of passing through the dilated cervical canal. Not only does this animal build a nest and brood like a

[1] Eleventh and Twelfth Reports of the Director of Veterinary Education and Research, Part II, 1927, Pretoria.

[2] *The Platypus*. By Harry Burrell, C.M.Z.S. Sydney: Angus and Robertson, Ltd.; London: The Australian Book Co. 1927. (Demy 8vo, pp. 227; 35 plates. 25s.)

hen; it suckles its young after the eggs are hatched, possesses a common cloacal aperture like the lizards, and is furnished with channelled spurs and poison glands resembling the fangs of the serpent. It and its relative, Echidna, are the sole surviving representatives of a race of great antiquity, which in Mesozoic times represented the aristocracy of the animal kingdom and were the lords of creation. At the present day it burrows peaceably in the banks and noses in the sandy bottoms of Australian rivers, and although zealously protected by the Australian Governments, it still retains some of its ancient defensive habits. Of these the most remarkable is that exhibited by the female of blocking up her nesting burrow with a series of mud barricades, or "pugs," as a protection against the ingress of enemies that no longer exist, the pugs being dug through whenever she leaves her nest, and replaced on her return.

REGULAR MEDICAL EXAMINATION.

IN our issue of September 26th, 1925 (p. 575) we noted the formation in Manchester of a company under the name of Family Medical Services, Limited, which had arranged at Lloyd's the "Anchor" policy for providing for the middle and professional classes a proportion of the cost of doctors' fees. We have now received from the company particulars of a scheme for what is called "regular medical overhauling" of subscribers. We find ourselves again obliged to complain of some lack of lucidity in the documents issued by those responsible for this undertaking. According to the latest prospectus, "Family Medical Services and Regular Medical Examination Association have no interest in the financial results of the schemes, and are merely to receive a percentage which . . . has up to date fallen short . . . of actual expenditure." Fees for regular medical examination are "a question of some difficulty"; but it is suggested that the fee for examination of the first member of the family should be 7s. 6d., and for each other member 6s. The examination is to be carried out twice annually, and the result to be sent to the Regular Medical Examination Association in the form of a report by the doctor. The report is to state either that the person examined is in sound health, or that he is advised to have treatment under one of five headings—medical, surgical, dental, ophthalmic, or institutional. Whether, as a result of the report, Family Medical Services then steps in and urges the patient to have treatment, partly at the company's expense, is not stated. Anyone wishing to take part in the scheme is to write to the R.M.E. Association expressing a wish to subscribe for half-yearly medical supervision, and agreeing to pay the fees mentioned above. We are not told whether it is to be inferred that the R.M.E. Association—without any financial interest in the scheme—takes a percentage of the seven-and-sixpenny and six-shilling fees of the doctor, or whether Family Medical Services is the connecting link and provides the percentage upon which the Regular Medical Examination Association exists. We suggest that both bodies might be advised to employ an expert draughtsman to edit their prospectuses. In the meantime, those who wish to investigate the schemes may communicate with the head office, 20, York Street, Manchester, or the London address, 1 and 2, Great Winchester Street, E.C.2.

THE ROYAL VETERINARY COLLEGE.

AN appeal for £50,000 is being made on behalf of the Royal Veterinary College, Camden Town, of which Professor Frederick Hobday has been recently appointed principal. It is estimated that a sum of £85,000 is required to place the college in a satisfactory position in respect of building and equipment. A grant from the Development Fund of the Treasury of a sum not exceeding £35,000 has been sanctioned, subject to the condition that an equal sum at least must be provided otherwise. In an interesting historical note accompanying the appeal it is recalled that the study of veterinary science only started in England in 1791, when the College was founded. The first students were enrolled in the following year, and a diploma was granted to those who passed an examination after having attended for eighteen months. During the first four years of its existence the College relied on donations and subscriptions (supplemented by students' fees) for the funds necessary for acquiring a site, building operations, and remuneration of the staff, but in 1795 Parliament sanctioned an annual grant of £1,500. This grant was withdrawn about the year 1815. The College, however, continued to develop, and in 1876 the curriculum was extended to three years; in 1893 a fourth year of professional study was added. Between 1890 and 1894 nearly the whole of the accumulated funds of the College, amounting to over £15,000, were expended on building and equipment. Through lapse of time the present buildings have become inadequate in extent, many being actually unsafe and beyond repair. Bearing in mind the national importance of the work carried on at the College, it is surprising to learn that in France and Germany the maintenance grants for the veterinary colleges in a single year before the war exceeded the total amounts given by successive Governments for veterinary education in England and Wales during the last 100 years. Help was, however, received recently from the Development Fund for the erection and equipment of the Research Institute in Animal Pathology, but no portion of it was applicable for improving the buildings devoted to education. The annual maintenance grants by the Ministry of Agriculture for research and education are also not available for capital expenditure on the College buildings. In view of the national losses inflicted by animal diseases there is urgent need of more intense and better directed study, and it is to be hoped that there will be a generous response to the present appeal. Over 6,000 cases are dealt with in the out-patient department annually, and thus invaluable opportunities are available for the education of students if only the buildings can be rendered adequate. The Earl of Northbrook is acting as treasurer of the fund.

THE museum demonstrations at the Royal College of Surgeons of England, for advanced students and medical practitioners, will begin on Friday, October 14th, when Sir Arthur Keith will show results of recent researches into the reproduction and growth of bone. His second demonstration, on October 21st, will be on rheumatic and other changes in joints, illustrated by specimens from the Strangeways Collection, now in the museum of the College. His third demonstration will be on specimens illustrating congenital dislocation of the hip and other joints. The demonstrations will be given at 5 p.m. on each day in the theatre of the College, in Lincoln's Inn Fields.

THE Huxley Lecture will be delivered at Charing Cross Hospital Medical School on Thursday, November 24th, by Sir Archibald Garrod, K.C.M.G., F.R.S., Regius Professor of Medicine in the University of Oxford. The subject he has chosen is "Diathesis."

THE Rockefeller School of Biochemistry in the University of Oxford will be opened by the Right Hon. Viscount Cave, G.C.M.G., Lord Chancellor of England and Chancellor of the University, on Friday, October 21st, at 3.30 p.m.

INTERNATIONAL HEALTH ORGANIZATION.

[FROM A CORRESPONDENT AT THE ASSEMBLY OF THE LEAGUE OF NATIONS.]

THE interest at the annual meetings of the League of Nations at Geneva in September shifts further and further from the Assembly itself, which is little more than a platform for ornamental speeches, to the six Commissions, among which the oversight of the League's various activities is distributed. It is in the Commissions that the more vital discussions take place, and there also the effective resolutions are framed. The endorsement of these resolutions afterwards by the Assembly in what is called plenary session is a mere formality. The work of the Health Organization comes before the Second Commission, which this year is presided over by Senator Dandurand of Canada. The discussion occupied the greater part of two days. The members of the Commission include at least three medical men—Dr. Walter Elliot, M.P., representing Great Britain, the Hon. Philippe Roy, representing Canada, and Professor Calvo Mackenna, representing Chile.

The Year's Work.

The discussion on the work of the Health Organization was introduced by Sir RAMASWAMI AYYAR, one of the delegates for India, who referred to the welcome innovation made during the last year by the Health Committee in the appointment of expert assessors who took part in the work of the League in an advisory capacity. The appointment of assessors from countries as distant from Geneva as Australia and Japan showed how far the Health Organization extended. From the Bureau of Epidemiological Intelligence at Singapore weekly reports on the health conditions in 137 ports of Asia, Australia, and East Africa were transmitted to a number of wireless stations. A more recent development was the weekly distribution of epidemiological information from the wireless station at Nauen, in Germany. The Sleeping Sickness Commission had terminated its work, and had produced a report of much interest. The interchanges of public health officers on study tours had proceeded, and a further development was the organization of international health courses, each course lasting about seven weeks, and consisting of lectures, discussions, and practical demonstrations. The first of such courses was held in Paris during the early months of this year, and the second will be held in London in November and December. Sir Ramaswami Ayyar also referred to the report of the Malaria Commission. As one result of the Commission malaria courses had been organized at the Faculty of Medicine, Paris, the London School of Hygiene and Tropical Medicine, and the Institute of Maritime and Tropical Medicine, Hamburg. A laboratory course of some four weeks' duration was followed by two months' work in certain malarial districts of Italy, Spain, and Jugo-Slavia. The expenses incurred by attendance at these malaria courses were a charge on the League Health Budget, and the courses were necessarily limited to medical officers engaged in malaria work in Government employ in different countries. Another phase of the League's health activities had been the International Rabies Conference held in Paris in April last, which had afforded the first opportunity for directors of institutes from all parts of the world to meet and compare experiences of the results obtained with various modifications of the original Pasteur method in use in their laboratories. Two other important activities touched upon by Sir Ramaswami Ayyar were the study of health insurance by an expert commission, which met in April last and decided on its programme of inquiry, and the study, also by an expert commission, of infant welfare in certain selected countries. This latter inquiry was now proceeding in seven European and one or two Latin American countries, care being taken to include areas with high and with low infant mortality and rural and urban districts. Sir Ramaswami Ayyar concluded his survey of the health activities of the League with an assurance of the hearty co-operation of India.

Health Mission to Latin America.

An account was given to the Commission by Professor CALVO MACKENNA, delegate for Chile, of the mission recently carried out in certain Latin American countries by the Health Committee of the League. The president of that committee, Dr. T. Madsen, and the medical director, Dr. Rajchman, visited Latin America, mainly in connexion with a survey of the causes of infant mortality (a matter of special interest to Latin American countries in view of the sparseness of their populations), but they included general health conditions within their scope. Professor Mackenna described the gathering at Montevideo last June of delegates from six South American countries to study the medico-social causes of infant deaths. The conference was presided over by the Minister of Industry of Uruguay, and attended by the President of the Republic. Investigations were set on foot, and later there will be another gathering and an exchange of views on the results of the inquiry. Professor Mackenna also announced that the Argentine Government was supporting a proposal to establish at Buenos Ayres, under the auspices of the League, an international health centre for infant welfare. He went on to plead for a further extension to South America of the system of interchanges of public health personnel, with the granting of scholarships to Latin American medical men to enable them to follow the courses of higher education in public health at Buenos Ayres and Rio de Janeiro. There was a proposal from the Brazilian federal public health service that an international leprosy research centre might be established, also under the auspices of the League. A Brazilian philanthropist, Dr. Guinle, was prepared to contribute £2,000 a year towards the expenses of such a centre. Another proposal was to inaugurate in South America a centre for researches into the serodiagnosis of syphilis. This proposal was made by the Institute of State Hygiene at São Paulo, which was willing to meet a proportion of the cost. Another South American enterprise mentioned by Professor Mackenna was the sending over to Europe from Uruguay of a medical deputation to study the system of national health insurance with a view to the introduction of the system into Uruguay. Yet a further instance of the interest in public health in South America was the engagement by the Chilian Government of a Japanese expert from the Imperial Institute for Research on Nutrition in Tokyo for the purpose of inaugurating a similar service in the Central Health Department of Chile.

In some general discussion on the health work of the League, M. NAGAI of Japan said how much Japan appreciated the advantages of the interchange of experts; M. VEVERKA of Czechoslovakia described how his country was tackling the problem of social health insurance, and Baron DE VEST of Hungary, Herr BREITSCHEID of Germany, and M. DE VASCONCELLOS of Portugal reported various public health measures in their respective countries.

Dr. W. E. ELLIOT, M.P., of the British delegation, spoke of certain aspects of the work of the Health Section, which so far had not been fully brought out. Among these was the work on the investigation of disease, particularly cancer and malaria. The cancer investigation was still in its infancy, but he could imagine no field in which the comparative method would yield more useful results. In the investigation on malaria great work had already been done. Malaria was a disease which had a special interest for the League of Nations in view of the League's work in connexion with refugee and migration problems. The example of England, which, although a malarious country, with many marshes and sluggish rivers, had been able almost to eliminate indigenous malaria, was encouraging for localities more severely afflicted. Another instance of the value of the health work of the League was in connexion with the standardization of dangerous drugs. It was a matter for justifiable pride that the official requirement all over the world with regard to many drugs was simply that they should conform to the standards set up by the League of Nations Commission. Finally, Dr. Elliot suggested that the health work of the League, with its opportunities for research and adventure, helped the League to make an appeal to the new generation not

less thrilling than the pomp and circumstance of war had made to the old.

The Commission adopted unanimously two resolutions. The first of these expressed gratification at the continued development of the international activities of the Health Organization, and in view of the recommendations made by the International Pacific Health Conference held at Melbourne at the end of last year, regarding work which might be done in connexion with the study of health problems in the Pacific area, asked that such work might receive the early and full consideration of the Health Committee. The second resolution was in the form of a blessing upon the extension of the work of the Health Organization to the countries of Latin America, commending to the consideration of the Council and the Financial Committee the several proposals mentioned by Professor Mackenna as having been put forward by the health authorities of Argentine, Brazil, and Uruguay.

Health Budget of the League.

The Fourth Commission approved the Health Budget of the League, which estimates a total expenditure for 1928 of 1,381,333 Swiss francs, or about £55,000. Towards this amount, however, the Rockefeller Foundation subscribes 388,695 francs, so that the total contribution of the League to health services is below £40,000. The salary of the Medical Director is 53,000 francs (£2,120). The proposed new work in Latin America, however, will involve certain supplementary votes.

The very interesting discussion on alcoholism, which took place also in the Second Commission, is the subject of a note elsewhere (p. 558).

Nova et Vetera.

MEDICAL TRADITIONS AND EXPERIENCES OF A VICTORIAN NOVELIST.

THERE is much of interest to medical historians in the life[1] of G. P. R. James by Mr. Stewart M. Ellis. The novelist, so dear to our grandfathers but now almost forgotten, was the grandson of Dr. Robert James, patentee of "James's powders," and the son of Pinkston James, who practised as a physician in George Street, Hanover Square, during the latter part of the eighteenth and earlier part of the nineteenth centuries. Old Robert James was a character. The fellow townsman, schoolfellow, and lifelong friend of Dr. Johnson, he resembled that great type in the quickness of his temper, in scholarship, and in the frankness of his dealings. Irritable to a degree, Dr. Robert would allow no one to contradict him save the mighty Dr. Samuel, and the latter, though he had no great opinion of the other's pharmaceutics, nevertheless enjoyed his society and applauded his general skill in medicine. Boswell records Johnson's reception of the news of James's death in 1776, and is surprised at his apparent coldness. "Ah! poor Jamy!" was all Johnson said, though later, "when we were in the chaise, he said with more tenderness, 'Since I set out on this jaunt I have lost an old friend and a young one; Dr. James and poor Harry' (meaning Mr. Thrales's son)." Afterwards, of Gilbert Walmsley he wrote: "At this man's table I enjoyed many cheerful and instructive hours, with companions such as are not often found—with one who has lengthened, and one who has gladdened, life; with Dr. James, whose skill in physic will be long remembered; and with David Garrick." "No man brings more mind to his profession" was another remark of Johnson's when discussing the inventor of the powders.

These were patented in 1746, when James filed a specification of a pill and of a powder. The ingredients of the latter were afterwards found not to tally with those of the doses sold for James by Newbury the bookseller. Newbury sold two doses for half a crown, "with good allowance for those who buy them for charitable uses." The public bought and swallowed, not knowing what they swallowed, and were backed by their medical attendants. No less a man than Horace Walpole encouraged the use of James's powders with his high, if fantastic, social prestige. The gentle Cowper attributed to their use the recovery from illness of Mrs. Unwin, and an eminent physician, while applauding their employment in the army, believed them to be composed of powdered human cranium. Hartshorn was commonly held to be one of their ingredients, which are given by the encyclopaedias as calcium phosphate and antimonious oxide. Powerfully sudorific, they fell into disuse when fevers ceased to be treated with depressants, but they linger in the *British Pharmacopoeia* as pulvis antimonialis. The secret is indeed out, though they were long handed on as a "mystery" in the James family.

How far G. P. R. James benefited by this lucrative secret is not clear, but he lived at a high rate, as his grandfather had done. Monetary difficulties taking him to the United States, he was British Consul in 1853 at Norfolk in Virginia, and here he encountered the yellow fever, "an African disease unknown in the New World till they began importing negroes." As late as 1891, when the late Dr. Charles Creighton published his exhaustive work on epidemics, the fever was traced to filth in the slave ships, and especially to bilge-water, but the true cause—the nightly bites of the *Stegomyia fasciata*—was unknown. James, in a letter to his publisher, speaks of himself as "surrounded by swamps and marsh miasma" and "eaten up by mosquitos and black flies." Yet the mosquito remained unsuspected, though it is curious to find that the great visitation of yellow fever in Norfolk in 1855 was heralded "by a plague of peculiar flying insects, partly yellow in colour." The *Stegomyia* mosquito, however, is a black insect, with silvery markings on its thorax. Many of James's friends died of the disease, and some of them exhibited grievous symptoms, notably a Mrs. Barron, wife of a commodore, from the pores of whose face blood oozed so quickly that it was useless trying to wipe it away. Norfolk was a city of desolation comparable to that which reigned in London during the Great Plague.

When the British consulate was transferred to Richmond James, during his first winter there (1856), encountered an epidemic of diphtheria, then supposed to be a new disease. A well known Southerner, Preston Brooks, was its first victim. He was supposed to have been killed by his physician, who, to quote Charles James, son of the novelist, "insisted, against the patient's instincts, on surrounding his throat with powdered ice, which caused coagulation and death in a very short time. Before long diphtheria was epidemic in Richmond. When my father [G. P. R. James] had it, his throat was cleared out repeatedly with lunar caustic." This treatment, the son thinks, may have staved off suffocation. Two years later, he believes, the disease crossed the ocean, creating panic in Europe. The principal epidemics were in particular towns, and in England diphtheria was known as "Boulogne sore throat." It was especially prevalent here in the winter of 1858-59, being regarded as a new disease of transatlantic origin, though it was really no novelty

To G. P. R. James's own medical traditions and experiences should be added those of his wife, whom he married in 1828; she was the daughter of Honoratus Leigh Thomas, well known in his day as a leading London practitioner. He was President of the Royal College of Surgeons in 1829 and again in 1838. As a very young man he had come to London with an introduction to John Hunter, who characteristically bade him call at 5 o'clock in the morning, when the visitor found him busy dissecting insects. He became Hunter's dresser and a pupil of Cruickshank, whose daughter he married. Leigh Thomas was Hunter's near neighbour, and must have been deep in his tradition. We may well suppose that he told his son-in-law much about the great man, but beyond letting his readers know that he had long been familiar with the history of Sir Theodore Broughton's death by poison and presumably of the trial that ensued, in which John Hunter was a principal witness, James seems to have made no use of the John Hunter legend. In his novel *Sir Theodore Broughton, or Laurel Water*, published in 1848 by Smith, Elder, and Co., he missed a grand opportunity, for instead of describing Hunter's personality, of which he must have been abundantly aware through his father-in-law, he contents

[1] *The Solitary Horseman, or the Life and Adventures of G. P. R. James.* By S. M. Ellis. At the Cayme Press. 1927.

himself by alluding in his preface to the cautious and wholly admirable evidence of "the famous" John Hunter at the trial of Captain John Donellan for the alleged murder of his ward, young Sir Theodore Broughton, in 1781. John Hunter refused to commit himself to the assertion of other medical men to the effect that Broughton had died of a poisonous dose of laurel water, and merely insisted that the appearances at the *post-mortem* examination amounted to putrefaction and no more. Hunter thus very honestly refused to condemn Donellan in his evidence, and incurred the sarcasm of the judge, who indulged in comments on the valuelessness of medical evidence. James in his preface shows himself on the side of Hunter, and expresses the opinion that Donellan was not the murderer. In the novel he tells the story of Broughton's death and shows what was probably Donellan's actual share in it, but of the trial he makes only a cursory mention on the closing page of his immense story.

George Payne Rainsford James wrote some eighty romances, much read by his contemporaries, but also much skitted; for he opened most of his stories with "a solitary horseman" or two horsemen—one the hero, the other a king in poor circumstances—riding over a solitary landscape. So closely had the horsy beginning become associated with his name that G. P. R. James, in our fathers' days, was generally dismissed as a kind of joke by those patient and omnivorous novel readers, and since the sixties has fallen into undeserved neglect. Mr. Stewart Ellis is to the nineteenth century what the late Austin Dobson was to the eighteenth: he wears Dobson's mantle and is a scholarly and admirable biographer. But it is a question whether even he has read all James wrote, though his bibliography of James's works, which includes over ninety items, is a model of what such things can be. It would be interesting to know if G. P. R. James ever treated a medico-legal theme save in his novel above mentioned and in one other, *The Commissioner*, which deals, interestingly no doubt, with lunacy.

V. G. P.

Ireland.

IRISH FREE STATE ELECTION.

THE following members of the medical profession are among those elected to the new Irish Parliament:

Sir James Craig (Dublin University). Independent.
Dr. T. Hennessy (Dublin City, South). Government.
Dr. Myles Keogh (Dublin City, South). Government.
Dr. P. J. O'Dowd (Leix-Offaly). Fianna Fail.
Dr. J. J. O'Reilly (Cavan). Government.
Dr. James Ryan (Wexford). Fianna Fail.
Dr. Sean Tubridy (Galway). Government.
Dr. Ward (Monaghan). Fianna Fail.
Dr. Vincent White (Waterford). Government.

It will be recalled that Dr. Thomas Hennessy, Irish Medical Secretary of the British Medical Association, was successful at the by-election in the same constituency shortly before the dissolution of the Dail. He is to be congratulated warmly upon repeating his success at the General Election on September 15th. There has been much delay in declaring the results of the polling in many constituencies, owing to the very tedious method of counting and elimination which accompanies proportional representation.

MEDICAL INSPECTION OF SCHOOL CHILDREN IN NORTHERN IRELAND.

An efficient system of medical inspection and treatment of children in primary schools is one of the great advantages conferred by the Education Act of Northern Ireland. The Ministry of Education in its report states that during the year 1926-27 there was a marked growth of interest on the part of local education authorities in this subject. This may be attributed, not only to the united efforts of the Ministry of Education and the Ministry of Home Affairs to awaken in the local education committees and the general public a sense of the importance of this branch of the work, but also to the desire of the committees themselves to ascertain the extent of the problem presented by the afflicted child. Moreover, a spirit of health rivalry has been aroused by the gratifying results achieved in those areas where medical inspection has been introduced at a very early stage. Some education committees had, in fact, addressed themselves immediately to the investigation of the physical condition of the children; but others, less convinced of the necessity for action, or somewhat apprehensive as to the cost, had hitherto appeared reluctant to take any serious steps towards the fulfilment of these duties. Apart from the education authority for the county borough of Belfast, the Ministry has now received reports of the working of schemes of medical inspection of school children in: (1) the combined areas of Larne, of Lisburn and Belfast (rural), and of Antrim; (2) the combined areas of Londonderry and Limavady, of Coleraine and of Magherafelt; (3) county Fermanagh. These reports show not only that the necessity for systematic medical and dental inspection is great, but also that this need has hitherto been almost entirely unsuspected by the public. At first the medical officers of the local authorities encountered opposition on the part of both pupils and teachers, who did not understand the purpose of medical inspection. Since it has been discovered that these inspections have brought to light physical defects which were previously unsuspected, however, opposition has rapidly disappeared, and parents have been anxious to have their children examined. Not only this, but it has also been found that parents generally have shown commendable alacrity in taking steps at their own expense, so far as has been possible, towards the remedy of the physical defects disclosed as the result of the medical examination of their children. The reports of the medical officers in the above-mentioned areas show that the work so far accomplished, though as yet necessarily incomplete, has been very valuable. All sections have been roused to the sense of their responsibility, and there is a growing eagerness to have the work continued and extended.

MEDICAL TREATMENT FOR INSURED PERSONS IN THE FREE STATE.

At the annual meeting of the delegates from the National Association of Insurance Committees (Ireland), which was held recently in Dublin, a memorandum was approved in connexion with the provision of medical treatment for insured persons in the Free State. The association, having considered the final report of the Committee of Inquiry into Health Insurance and Medical Services, desires to place on record its considered views on certain recommendations therein as follows:

1. The association is convinced that the only satisfactory solution of the problem of the provision of adequate medical treatment for the working classes and their dependents—whether insured persons or otherwise—in Saorstat Eireann lies in the immediate adoption of a national scheme of medical services on a contributory basis, comprehensive in scope, and freed from all association with Poor Law administration.

2. The association emphatically disagrees with the suggestion made in the final report that for various reasons—mainly financial—the immediate adoption of such a comprehensive scheme is not practicable. Not only is the care of the public health one of the first duties of government, but true national economy lies in the preservation of the working capacity of the people. Economy secured at the expense of the people's health is prodigal waste of a national asset.

3. The association agrees that unless a national scheme, embracing insured persons as well as others, is immediately adopted the provision of medical benefit for insured persons is an urgent necessity.

4. The association cannot commend the proposals for medical benefit adumbrated in the final report as satisfactory to insured persons. In its opinion the very limited advantages which they might confer on certain classes of insured persons are not commensurate with the sacrifices which insured persons generally, as well as their employers, are called upon to make.

5. The association considers that any scheme of medical benefit, to be satisfactory to insured persons, must comply with certain essential conditions: (*a*) It must be completely dissociated from Poor Law administration. (*b*) The treatment provided must be thoroughly efficient, which connotes agreement with, and the full co-operation of, the medical profession. (*c*) Being on a contributory basis, its operation must be open to the free criticism of the persons whom it serves, and it must provide convenient machinery for the investigation of complaints. It must, therefore,

be locally administered by bodies on which the contributors as well as the other interests concerned are represented.

6. The association strongly urges on the Government the immediate adoption of a comprehensive national scheme of health services for insured persons, as well as other members of the community, unable to provide adequate medical treatment in illness, on similar lines to those advocated by the Irish Public Health Council and the County Council's General Council.

7. The association protests strongly against the proposal to deprive insured contributors of the right of representation, guaranteed to them under the National Insurance Act, 1911, which is involved in the recommendation for the abolition of Insurance Committees.

Scotland.

EDINBURGH UNIVERSITY CHAIRS.

WITH regard to the chair of forensic medicine and the chief police surgeonship in the city of Edinburgh, rendered vacant by the recent death of Professor Harvey Littlejohn, steps have been taken for conducting the duties of the latter post, to which an interim appointment has been made of Dr. Douglas Kerr. Dr. Kerr has, for the past five years, held the post of assistant to Professor Littlejohn in both appointments. The appointment to the chair of forensic medicine in Edinburgh University is in the nomination of the Crown, and no appointment has yet been made. In regard to the chair of medicine, Professor G. Lovell Gulland, whose resignation was recently intimated to the university, has been reappointed to continue in office during the forthcoming winter session. The resignation was to have taken effect on account of the Professor's retirement, on attaining the age limit, from his position as physician to the Royal Infirmary of Edinburgh. The relinquishment of wards at the age limit does not, however, take effect before December of the present year.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH, ST. ANDREWS.

The syllabus for the winter session of 1927 at the James Mackenzie Institute for Clinical Research, St. Andrews, has now been issued. Addresses on clinical subjects, followed by discussions, to which all practitioners are cordially invited, will be given on Tuesday afternoons, at 4 p.m., while on Friday afternoons, at the same time, meetings are held for clinical discussions. On Tuesday, October 4th, the introductory address will be given by the honorary director, Mr. A. M. Ramsay, on ocular manifestations of gastro-intestinal disorder, and the ensuing discussion will be opened by Dr. W. C. Souter, lecturer on ophthalmology in the University of Aberdeen. Dr. J. B. Orr, director of the Rowett Research Institute, Aberdeen, on October 11th, will deal with the influence of diet on the physiology of the stomach; he will be followed by Professor Herring of the University of St. Andrews. On October 18th Professor John Fraser will consider superficial pain as an aid in the differential diagnosis of abdominal disorder, and in the following week Dr. R. O. Adamson will describe dyspepsia as met with in general practice. Professor D. P. D. Wilkie will deal with gall-bladder disease and gall stones on November 1st, and Professor F. J. Charteris, on November 8th, will discuss pharmacological principles in their relation to common gastro-intestinal ailments. The clinical significance of haematemesis will be the subject of an address by Dr. E. Matthew on November 15th, and the surgical aspects of gastric and duodenal ulcer will be considered by Professor Archibald Young on November 22nd. The early symptoms of cancer of the stomach will be described by Dr. Edmund Spriggs on November 29th, and Sir George Lenthal Cheatle, on December 6th, will lecture on some recent views about carcinoma as applied to the colon. The last two lectures of the session will be given respectively by Professor Robert Muir, on December 13th, who will discuss the dissemination of malignant disease, with special reference to the abdomen; and by Professor John Marnoch on the following Tuesday, who will enumerate some pitfalls in the diagnosis of acute abdominal conditions. The subjects dealt with on the Tuesday afternoons will be found in our Diary, published weekly in the SUPPLEMENT, and the syllabus of the course may be obtained from the secretary at the institute.

NURSING SERVICES IN SCOTLAND.

At the opening of a fête held in the grounds of the Atholl Palace Hotel, Pitlochry, on September 15th, the Duchess of Atholl, M.P., Parliamentary Secretary to the Board of Education, delivered an address in which she outlined the position of district nurses in Scotland. The fête was held on behalf of the funds of Queen Alexandra's Scottish Nursing Memorial Fund and of the Pitlochry District Nursing Association. Her Grace said that there had been a great advance in the nursing facilities provided throughout Scotland, and that to-day it was recognized that skilled nursing was just as essential for the restoration and preservation of health as skilled medical or surgical treatment. A great impetus had been given to this movement by the Queen Victoria Nursing Institute. In more recent years the institute had given its nurses training in such matters as infant welfare, school medical nursing, and other health interests lying within the scope of the local authority. The Queen's nurses were the most highly trained type of nurse in the country, and the Government recognition provided for useful co-operation between statutory bodies which had powers to promote the health of the people in different ways and voluntary associations which dealt with many problems of health. Some 700 Queen's nurses were at work in different parts of Scotland; these were trained at considerable cost, and in recent years the institute had been faced with an annual deficit. A further increase of fully 50 per cent. of nurses was required to meet the needs of Scotland. The object of the Queen Alexandra Fund was to endow the institute and enable it to carry on its great work, as well as to provide a lasting memorial to Queen Alexandra, who had done much to develop and encourage nursing during her lifetime.

SCOTTISH QUARTERLY STATISTICS.

The more outstanding features of the vital statistics of Scotland during the second quarter of 1927 are a birth rate of 20.6 per thousand, a marriage rate of 6.5, and a death rate of 12.9. The death rate is 3.2 below the previous quarter and is the lowest yet recorded in Scotland for the second quarter of any year. The actual number of deaths during the three months was 15,801. In the larger burghs, taken individually, the quarterly death rate ranged from 14.9 in Coatbridge, 14.8 in Dundee, 14.5 in Glasgow, and 14.0 in Perth, to 9.7 in Kirkcaldy, 9.9 in Ayr, 10.1 in Clydebank, and 10.2 in Hamilton. The quarterly death rate in England and Wales was 11.0 per thousand, and in Northern Ireland 15.9 per thousand, the former being 1.9 less, and the latter 3.0 more, than the equivalent Scottish rate. The infantile mortality rate in Scotland for the quarter was 78 per thousand births, which is a low figure. Of the total deaths 13 were from enteric fever, 110 from measles, 45 from scarlet fever, 269 from whooping-cough, and 70 from diphtheria. The deaths from influenza were 432, from encephalitis lethargica 27, and from cerebro-spinal meningitis 44. The deaths from tuberculosis, all forms, numbered 1,346, being 8.5 per cent. of the total deaths in the quarter.

England and Wales.

GUY'S HOSPITAL.

PERHAPS the chief matter of interest in the Guy's Hospital report for 1926 is to be found in the appendix to the treasurer's report. King Edward's Hospital Fund desired that hospitals should extend the principle of costing in various departments of their work, so as to show in greater detail the expenses of the services rendered. In the appendix to the treasurer's report a preliminary attempt has been made to introduce a detailed costing system. From this it is shown that in a total of £185 per occupied bed the most expensive item is £70 for

salaries and wages. This is not surprising, since it is stated that it takes approximately three people to look after two patients; or, in round figures, 600 patients in hospital require 900 people daily working directly or indirectly on their behalf. The report shows also that certain departments, such as the venereal diseases department, are very expensive in comparison with ordinary out-patient treatment. It is suggested that in future, when the expenses of out-patient treatment in different hospitals are compared, it should be noted against each hospital whether a whole-time venereal department is maintained or not. In a table on the unit of cost in various departments it is interesting to note that the cost per patient in the paying ward was £7 18s. 4d., as compared with £10 4s. in the general wards. This apparent anomaly is explained by two reasons. In the first place the paying ward is charged only with maintenance and bears no charges for administration; secondly, the average occupation of beds in the paying ward is only twelve days, whereas in the general wards it is twenty. The actual cost per occupied bed in the paying ward is £219, as compared with £185 in the general wards. About 10 per cent. of the cost per bed appears in the analysis as "unanalysed expenditure." The report contains an appeal for the endowment of medical education and research; and subscriptions are invited to a discretionary fund, which can be allocated between the hospital and the school in proportion to their respective needs.

Crumpsall Infirmary, Manchester.

Mr. A. H. Burgess, professor of clinical surgery in the University of Manchester, opened, on August 4th, new buildings at Crumpsall Infirmary, with which he had been previously connected, first as house-surgeon in 1898, and subsequently as visiting surgeon for ten years. The total cost of the present extension scheme, including the provision of equipment, was about £20,000, and the additions comprise three operating theatres, two recovery rooms, *x*-ray and massage rooms, and a dispensary. Mr. Burgess in an address praised the enterprise and public spirit of the Manchester guardians in recognizing the responsibilities introduced by the modern advances in surgery by the provision of facilities which might be termed the very last word in hospital construction and equipment. The increasing co-operation of Poor Law hospitals with voluntary hospitals in general hospital work was also the subject of favourable comments by speakers at the ceremony. Crumpsall Infirmary was established in 1877, and has over 1,400 beds, of which the average number occupied is given as 1,259. A training school for nurses was instituted at the commencement of its existence. Beds are available for private patients.

Laboratory Assistants' Association.

The second conference of the Pathological and Bacteriological Laboratory Assistants' Association was held at the end of last month in the Department of Pathology of the University of Cambridge, and was attended by members from the Gold Coast, South Georgia, Shanghai, and from all parts of the British Isles. An official welcome was accorded by the Vice-Chancellor, who congratulated the association on the valuable share it was taking in the advance of scientific knowledge. During the conference the Junior Greenfield prize and medal were presented to Mr. E. B. Brain of Birmingham for colour drawings on pathological subjects. The Sims Woodhead medal was presented to Professor Lorrain Smith, the first president, in recognition of the great assistance he had given since the formation of the association in 1912. The subjects dealt with at the conference included the manufacture of small-pox vaccine in Shanghai, the dietary of rabbits and guinea-pigs, antagonism and symbiosis of bacteria, the development of parasitology, the preparation of plague vaccine, and tissue culture technique. A comprehensive exhibition of laboratory work and apparatus was arranged, and visits were paid to the various centres of interest in the neighbourhood. The conference dinner in Trinity Hall was attended by 104 members and guests, including the Vice-Chancellor and Professor G. H. Nuttall.

Light Treatment in Bermondsey.

A new institute for light treatment was opened in Bermondsey in June, 1926, at the rear of the tuberculosis dispensary. Two large rooms for light treatment are provided, one for men, the other for women; each room is fitted with a small dressing room, and is under observation by a nurse's and a doctor's room. The mercury vapour lamps employed have long leads, so that they may be taken out into the adjacent open yards when the weather is propitious, thus enabling treatment to be given in the fresh air. Overheating inside the rooms is prevented by large folding doors, which can be kept open except in the most unsuitable weather. During 1926 treatment was given to 341 patients, the total number of attendances being 10,416. Many patients came from the tuberculosis dispensary, and others from the maternity and child welfare clinics; a large number had been sent for treatment by general practitioners. Patients with definite tuberculosis comprised 27 per cent. of the total number treated, while cases of debility and malnutrition formed 37 per cent.; the great majority of the latter—debilitated children—came as "contacts" from the tuberculosis dispensary. In his annual report for 1926 Dr. R. King Brown expresses his belief that light treatment will benefit to a greater extent the people of northern countries, where the natural sun is deficient, than those from southern Europe and the tropics. Dr. D. M. Connan, the clinical tuberculosis officer, who is in charge of the light treatment, emphasizes the importance of regular attendance, and reports that children who come from very overcrowded homes make slow progress; he thinks that light treatment in such cases can only counteract in part the results of bad housing conditions.

Royal Institute of Public Health.

A course of lectures on the health of the nation will be delivered at 37, Russell Square, W.C.1, on Wednesday afternoons, at 4 p.m., from October 12th to December 14th inclusive, under the auspices of the Royal Institute of Public Health. The first lecture will be given by Dr. Saleeby, on sunlight for childhood, and the second by Professor S. Lyle Cummins, on tuberculosis as a social disease. Professor Hobday will describe some diseases conveyed to man from animals, and Sir Henry Gauvain will deal with tuberculosis as a problem of childhood. The present situation in regard to housing will be discussed by Dr. F. E. Fremantle, and the subject of a policy as regards the milk supply will be treated by Professor R. Stenhouse Williams. Dr. A. Dingwall Fordyce will lecture on the prevention of heart disease, and Professor Blair Bell on the prevention of cancer. The final two lectures of the series will be given by Dr. L. R. Lempriere, who will speak on the health of the public school boy, and Professor E. W. Hope, who will deal with the changed conditions of quarantine. These lectures are intended for all those interested in medico-sociological problems. The Harben lectures will be delivered in the lecture hall of the institute on October 17th, 18th, and 20th, at 4 p.m., by Professor R. Bruynoghe, director of the Institute of Bacteriology in the University of Louvain, who will take as his subjects "The Twort-d'Herelle phenomenon" and "Some new research on relapsing fever." It is announced that the annual congress of the institute in 1928 will be held in Dublin.

Royal Northern Hospital: *X*-Ray Department.

A new *x*-ray department has been recently opened at the Royal Northern Hospital, London, the limitations of the old one having been corrected by rebuilding. The department now consists of a screening room, a dental room, a special radiographic room for the examination of the skeleton, and a treatment room, with the usual accessories. The latest type of *x*-ray tube has been installed; this confers upon the operator a hitherto unattainable degree of immunity from danger. The screening and radiographic rooms have been equipped with a high tension transformer which is silent in operation. The cost of the new department has been approximately £2,500, of which there remains a sum of £900 to be raised.

Correspondence.

BRITISH DOCTORS IN MADEIRA.

SIR,—Your reference to the position of British medical practitioners in Madeira (SUPPLEMENT, August 20th, p. 118) prompts me to say, with your permission, that there is no tangible likelihood of the exercise of any powers the island authorities may possess in disturbance of the present status.

I am mainly responsible for the statements recently conveyed to our Embassy in Lisbon and to the General Medical Council in London, and I can definitely assert that the local councils too fully realize the need of British medicos among the steadily expanding influx of Madeira tourists and climate seekers to take any step hurtful to this substantial source of their prosperity.

There is now no lack of reciprocity in Portugal, and I will by and by submit to you the necessary conditions for qualifying to practise in this country. The fees are light, and there is no power to exact special payments. Two British registered general practitioners now reside among their patients, and these still appeal to me in difficulties.

The trouble in 1866 concerned me personally when, though in charge of the whole British community at Funchal, I was abruptly cited to cease practising, and when in the same breath the druggists were warned against my prescriptions. I could probably have contested this ill-timed and ill-natured action, but, being fully equipped to face any reasonable examination, I elected to present myself in Lisbon as a candidate for the Portuguese diploma.

The competent medical authority in Portugal then centred in the Lisbon Board of Health, whose obstructive administration of an obsolete quarantine system had brought their country into notorious disrepute. This board, after protracted negotiations most ably conducted by Mr. Robert Lytton (afterwards Indian Viceroy), and in spite of a positive order from the Prime Minister, rejected my application on the ground that I had not studied in Portugal. We quoted the reciprocity clause in the Medical Act of 1859 without effect, and the Prime Minister, losing all patience with his insubordinate medical corporation, published a decree abolishing the board, himself assuming its functions. This action met with general approval, and the defunct body has never been revitalized. Special permission was at once accorded to me to follow my profession at Madeira, and at my own request the concession in the original document was extended in effect generally to English physicians. This *modus vivendi* has lasted more than sixty years, and will never be disturbed while my successors regard the national welfare and cultivate relations of amity with their Peninsular associates.

Those who come after me will find that I have done nothing to impair existing respect for British culture, and they will be fortunate indeed if they can justify a portion only of the attainments attributed to us, and expected of us, as custodians and exponents of natural science in its local aspects. It is clearly due to the learned bodies whence we come to maintain the tradition of our comprehensive training and mental aptitudes.—I am, etc.,

MICHAEL GRABHAM, M.D., LL.D., F.R.C.P.

Madeira, Sept. 5th.

"ETHER CLONUS": ALDEHYDE AND PEROXIDE.

SIR,—The occurrence during the last year or so of several cases of so-called "ether clonus" at St. Bartholomew's Hospital has caused me great concern, and I have been at some trouble to discover the cause. Cases were reported by the residents and others; they did not conform to the cases of ether clonus that I had met with myself years ago. Most of the cases seemed to have occurred after a fairly long anaesthesia, not as in the cases I had seen. The first point I noted was that occasionally when giving the gas-oxygen-ether-chloroform combination the resultant mixture inhaled by the patient had a somewhat acrid smell. At first I attributed it to faulty ether, and insisted on having the purest; but even then the same acrid smell was noticed on occasions. I then consulted Messrs. Duncan, Flockhart and Co., who at once gave me every facility. They have been throughout of the greatest assistance, and have at all times been most anxious and willing to help. At my suggestion they instituted a series of tests under the direction of Dr. W. Inglis Clarke, D.Sc., whose report may be summarized as follows:

Summary of Chemical Investigations.

Two tests were used in estimating the aldehyde in ether and chloroform: (*a*) Contact with caustic potash for twenty-four hours, when, if no colour was visible, it was assumed that the ether contained no aldehyde; (*b*) Nessler's solution, added to the water obtained after shaking equal volumes of distilled water and ether or chloroform for two minutes in a separating funnel. The second method was found to be both accurate and comparative. The first method gave fallacious results with chloroform, due to the interaction of alcohol. The peroxide present was ascertained by the *B.P.* test for solution of potassium iodide. The experiments were carried out by passing nitrous oxide or oxygen or a mixture of the two gases through chloroform, ether, or both, kept at a temperature of 40° to 50° C., and then examining the condensed liquid from the cooled gases, as well as the residues in the original vessels. The gases were passed through the liquids for one hour and for three hours in each case. The variable ways in which the gases were passed through the liquids gave a total of twenty experiments, in each of which the amount of peroxide and of aldehyde both in the residue and the distillate was estimated. As a result it was found that after the gases had been passed for more than one hour through ether there was a distinct tendency to the formation of peroxide. In less than one hour there was usually none. In some cases there was a slight formation of peroxide if the ether was kept standing overnight, and after a few days peroxide would develop in the ether. But the amount was usually about 1 in 100,000, and never exceeded 1 in 50,000. With regard to the aldehyde the amount detected was very small indeed; it never exceeded 1 in 80,000, and was often not more than 1 in 200,000. Standing overnight did not increase the amount of aldehyde.

As a result of these investigations it appears that when either oxygen or N_2O or a mixture of $O+N_2O$ is passed through chloroform or ether, or through both, a certain amount of both peroxide and aldehyde is formed. This discovery—which I frankly admit was new to me—leads me to think that, although the amounts as shown by the tests are very small, yet we cannot neglect them; and that in consequence, as the tests were conducted under the best possible conditions, we should try to use as little ether and chloroform as possible when giving the gas-oxygen-ether-chloroform combination, and these drugs should be the purest obtainable.

I do not know whether the presence of this small amount of peroxide and aldehyde would be sufficient to produce the condition of "ether clonus," and, indeed, I hardly think that it would; but on occasion when I have noticed the acrid smell that I have mentioned it appeared to me that there must be quite a large amount of some noxious substance present, and I have at once cut off the ether or chloroform and had recourse to gas and oxygen alone.

The impressions that I derive from this investigation are:

1. As peroxide and aldehyde are found, we should use as little ether and chloroform as possible.
2. The bottles containing the ether and chloroform should be thoroughly cleaned and sterilized every day.
3. As far as possible fresh ether and chloroform should be used for each case.
4. Whenever the acrid smell is noticed the ether and chloroform should be shut off.

I feel that this matter needs a much fuller investigation, and I hope to be able to continue it during the coming winter, but have thought it wiser to give this preliminary warning so that other anaesthetists may not only reap the benefit of this discovery, but be on the *qui vive* for any signs or symptoms that may help in the solution of the problem.—I am, etc.,

H. EDMUND G. BOYLE, O.B.E., M.R.C.S., L.R.C.P.,
Senior Anaesthetist to St. Bartholomew's Hospital.

September 2nd.

CONVULSIONS DURING ANAESTHESIA.

Atropine in Childhood.

SIR,—It would be unwise to allow the suggestion of Dr. Hornabrook (September 10th, p. 471), that convulsions occurring during surgical anaesthesia are due to overdosage of atropine, to remain unchallenged.

To cite the atropine dosage for children alone: at the Hospital for Sick Children, Great Ormond Street, a dose of 1/100 grain of atropine sulphate was given hypo-

dermically to all children of four years and upwards before every operation, until we found it wiser to administer the atropine by mouth instead of hypodermically. For some two years, since the atropine has been given by mouth, this dosage has been increased. The children take the atropine sulphate in two doses, the first two hours before the operation and the second one hour before the operation, the total amount being 1/80 grain for all children of 6 years of age and upwards. This does not cause convulsions.

As over 7,000 operations are performed at the above hospital every year, the children never exceeding 12 years of age, and every operation being preceded by the dosage of atropine already quoted, it can be assumed that atropine is not the cause of the convulsions in question, because these convulsions have not been observed by either myself or my colleagues on the anaesthetists' staff.—I am, etc.,

HAROLD SINGTON,
Senior Anaesthetist, Hospital for Sick Children, Great Ormond Street.

London, W.2, Sept. 15th.

"A FORGOTTEN BENEFACTOR."

SIR,—Surely Henry Hill Hickman was not, as Mr. Wayland Joyce says (September 10th, p. 471), "the real first discoverer of the anaesthetic relief of pain." General anaesthesia was known centuries before his time, but it was forgotten. Tom Middleton, in his tragedy *Women Beware Women* (Act IV, Scene 1, 1605 or thereabouts), writes:

> "I'll imitate the pities of old surgeons
> To this lost limb, who, ere they shew their art,
> Cast one asleep, then cut the diseased part."

As so often happens, the poet remembered and recorded what was forgotten by everybody else.

Anyone reading the surgical records of the thirteenth century must realize that the operations performed could not have been the successes they were if general anaesthesia was completely unknown. And in fact Guy de Chauliac (fourteenth century) has left this record:

> "Some surgeons prescribe medicaments, such as opium, the juice of the morel, hyoscyamus, mandrake, ivy, hemlock, lettuce, which send the patient to sleep, so that the incision may not be felt. A new sponge is soaked by them in the juice of these and left to dry in the sun; when they have need of it they put this sponge into warm water, and then hold it under the nostrils of the patient until he goes to sleep. Then they perform the operation."

Why the employment of general anaesthesia was given up, and the memory of it quite forgotten by the medical profession, are mysteries not easy to unravel. But probably the Black Death was responsible. So very many of the leading doctors, including de Chauliac himself, perished of the plague, taking with them their newly acquired knowledge; and, almost without doubt, the general public, disappointed and despairing, lost all faith in the medical profession. This much is beyond question—while the thirteenth and early fourteenth centuries were bright with the new-found triumphs in medicine and surgery, the following centuries were almost hopeless. It was not till the nineteenth century that anaesthesia and asepsis came once more into their own. But it should not be lost sight of that the so-called discoveries of the nineteenth century were in actual fact *re*-discoveries. Most of the pioneer work done then had been done already—in the Middle Ages.—I am, etc.,

FRANK G. LAYTON.

Walsall, Sept. 11th.

PAINLESS CHILDBIRTH.

SIR,—On page 35 of the *Epitome* of September 10th are summarized the experiences of two writers with Gwathmey's method of rectal ether anaesthesia. Harran's claim that "the applicability of this method is much greater than that of scopolamine amnesia" is contradicted by the limitations he himself mentions. It appears the method cannot be continued more than ten or twelve hours (what happens then is not stated), and that it should not be begun early. I have continued scopolamine amnesia for fifty-five hours,[1] and it has, I believe, been given for over 120 hours; it should be begun before the pains are severe; to deny the patient relief in the early stages, as in Gwathmey's method, is surely to stultify in part the term "painless childbirth."

Both writers emphasize inertia as contraindicating the ether method; in inertia scopolamine may be employed without hesitation, since by producing sleep it preserves the patient's strength and gives the best chance of a natural birth.

Properly given, scopolamine-morphine narcosis shows better results than "85 per cent. pain greatly relieved" (Harran), and "full analgesia in more than half the cases" (Naiditsch). Harran says "there was no increase of forceps delivery"; this is indeed "faint praise"! Scopolamine gives an increased percentage of physiological deliveries—that is, fewer forceps cases—because it obviates the use of instruments merely to shorten the sufferings or prevent exhaustion of the mother, or to placate the relatives; it is especially useful in labours that are likely to be prolonged—that is, difficult—in contradistinction to Naiditsch's experience with rectal ether. This writer also says that the morphine may be repeated, but this may entail danger to the child; in scopolamine amnesia the morphine should be strictly limited to the first dose.

Contrary to what Harran apparently implies, it is my experience that scopolamine-morphine narcosis is eminently suitable for use in a private house, and though it necessarily takes up much time and requires some experience to get the best results (which will not follow rule-of-thumb or standardized methods), it does not require "the service of a trained anaesthetist."

In these days of a falling birth rate, which is in part due to the dread of the sufferings of childbirth, it cannot be too widely known that scopolamine-morphine narcosis, properly given, affords a method of relief which is safe, harmless, applicable to all cases, and can be used in the patient's own home.—I am, etc.,

E. CURNOW PLUMMER.

London, N.W.8, Sept. 9th.

THE ABUSE OF CAESAREAN SECTION.

SIR,—The publication of Dr. Henry Jellett's paper under the above heading in the JOURNAL of September 10th (p. 451) should be warmly approved by all who have experience of obstetrics and are anxious that a high standard be maintained in this specialty. With the statistics in the paper, and the conclusions come to, I need not deal, as they are recognized as true and sound by all who are in a position and qualified to give an unbiased opinion. What I hope to do is to point out how this abuse often occurs, and suggest something for its control.

Caesarean section is a surgical operation and well within the scope of a properly qualified obstetrician's practice, but general surgeons may also well claim (and do so) that it is within their province; but it is not apparently realized universally that the true obstetric question is the *advisability or not* of the operation in any given case. That question can only be decided after careful consideration and examination by an obstetrician—whether with or without the help of other surgeons is immaterial for the moment to the argument.

Now so long as practitioners (often anxious to get the troublesome case "off their hands") are willing to transfer these cases to institutions, hospitals, or maternity homes, regardless of what expert hands they go into, so general surgeons attached to such institutions will prefer Caesarean section, as the easiest way out of the difficulty to them, according to their view. Consideration of the foregoing must point to the general practitioner as an important link in the chain of events leading to the results we are discussing. It is so easy to transfer cases into other hands, and the responsibility is apparently over. The trained midwife is another link in the chain. She has no option in her legal duties but to call in a "registered medical practitioner" in cases of difficulty; and local health authorities, acting through their maternity committees (not to mention the Ministry of Health itself), see no difference between different practitioners called to these cases, which almost always require specialist attention.

Criticism, so far—now the suggestion. The large share of the remedy is in our own hands; the profession as a whole must cultivate a "conscience" in obstetric

[1] *Lancet*, February 13th, 1926, p. 338

matters. Local bodies of the profession (the local Division of the British Medical Association, obviously, in most places) should teach with no uncertain voice, in season and out, that obstetric complications are work for obstetric specialists. An obstetric tragedy should be looked upon as a reproach to the local profession, individually and collectively, unless they have enforced this principle. Thus a real public opinion will develop, and then the aim will be to place an obstetric surgeon on the staff of all institutions that take maternity cases. His opinion will then be available, whether he does the operation or not.

Incidentally, the maternity mortality will be reduced as it has not yet been (Sir George Newman's Report shows there has been no fall in the last year). A difficulty has been a lack of practitioners with obstetric interests. On this point one would remark that there is no "money" in obstetrics alone as a specialty, but this is not the place nor the moment to deal with that difficulty.—I am, etc.,

Norwich, Sept. 13th. ARTHUR CROOK.

PREGNANCY AND GLYCOSURIA.

SIR,—In reply to Dr. Hawe's letter in the BRITISH MEDICAL JOURNAL of September 17th (p. 520), I beg to state that the possibility of the case being one of lactosuria has not been definitely eliminated. A rough and ready fermentation test was inconclusive, and could not be repeated as the condition did not return. I would point out, however, that lactosuria usually persists during lactation. Further, the amount of milk allowed under the "ladder diet" is too small to justify the appearance of lactose in the urine.

I agree with Dr. Hawe that the case was not one of diabetes mellitus.

My object in publishing the case was to call attention to the possibility of disorders of carbohydrate metabolism in the toxaemias of pregnancy. Since reporting the case, however, I see that insulin has been used with success in the treatment of hyperemesis gravidarum, so that my idea is not altogether novel.—I am, etc.,

Lisburn, co. Antrim, Sept. 19th. T. A. KEAN.

MEDICAL LITERATURE FOR KENYA COLONY.

SIR,—With reference to the letter appearing under the above heading in the *Lancet* of June 4th, 1927, the Council of the Kenya Branch of the British Medical Association desires to express strongly its disagreement with the statement made therein, that the medical practitioners of Kenya would gratefully welcome gifts of fairly up-to-date books on medicine and surgery.

The fact is that the medical department of the colony maintains a medical reference library which is accessible to all doctors in the colony. This contains all the best of the most recent medical publications, and takes in the majority of the standard medical and scientific journals published to-day. Furthermore, it is probable that the private libraries of medical men in this colony would compare favourably with those of their professional brethren at home.

While grateful for the suggested vicarious generosity of the President of the Victoria League, my Branch Council fears that the statement that medical practitioners in this colony feel a pressing need for textbooks of medicine and surgery may be misconstrued into a reflection on their professional efficiency.—I am, etc.,

J. B. CLARKE,
President, Kenya Branch, British Medical Association.

Nairobi, Aug. 24th.

THE PATIENT AND THE PROCEDURE.

SIR,—The letters of Dr. Adam Moss (August 20th, p. 328) and Dr. John Campbell (September 10th, p. 472) under the heading "Blood pressure" are worthy of attention.

Are we not in these days of clinical laboratory diagnosis and injection methods of treatment sometimes apt in our enthusiasm to think too much of the disease and not enough of the comfort of the patient? As a private practitioner of many years' experience I find that patients often object to being constantly worried with needle punctures, and even the blood pressure test—necessary (in my opinion) and useful though it is—is received sometimes with a half-hearted protest. To quote a personal experience: I was once ordered a daily hypodermic injection of a certain endocrine extract for fourteen days in succession. At the end of that time the backs of my forearms from the elbow to the wrist presented a series of red tender swellings; these were not due to sepsis, as I was most careful to see it was avoided.

Take, for instance, the Sippy regime for the treatment of acute gastric ulcer, especially as modified by Hurst (*Price's Textbook of the Practice of Medicine*, second edition, pp. 505-6). The remarks of Beaumont and Dodds (*Recent Advances in Medicine*, third edition, p. 174) are very much to the point. Were I a sufferer from the disease nothing would induce me to submit to the treatment. In my opinion the Lenhartz method is infinitely preferable and, I believe, gives equally good results.

The administration of the arsenobenzol compounds, collosols, vaccines, and many endocrine extracts involves puncturing the subcutaneous or intramuscular tissues and distending them with fluid (the most painful part of the process). Are these unpleasant methods of treatment really indispensable?—I am, etc.,

H. W. WEBBER, M.D.Lond.

West Looe, Cornwall, Sept. 12th.

THE INTERNATIONAL CONTROL OF DRUGS OF ADDICTION.

SIR,—The letter which appeared from Dr. W. E. Dixon on this subject in the BRITISH MEDICAL JOURNAL of August 6th (p. 235) concluded with these words:

"The menace on the Continent is already very real, and the medical profession in this country may be required to make a decision, sooner or later, as to whether the safety of and benefit to the British Empire which may be attained from the complete prohibition of heroin may not be greater than the palliative relief afforded to a few patients, which some of us think may be obtained with codeine or morphine."

The injurious effects of heroin have not been so patent in my experience as this letter suggests. The routine use of this drug to allay cough has always struck me as a sign of ignorance, since cough so frequently is the one bright side of a malady, being Nature's way to help clear the air passages. If people, however, are becoming addicted to this drug for other purposes the sooner it is put out of their reach the better.

My purpose in writing is to go further, and suggest the introduction of some control over the use of morphine, even for legitimate purposes, and by medical men.

Some years ago I was treating an elderly lady for asthma from which she had long suffered. She and her daughters said it was useless to do other than give her an injection of half a grain of morphine, to which she was accustomed from her own doctor. I protested that it was too much, and gave one-quarter grain, then one-eighth more, and finally, as the asthma persisted, as well as the daughters, an additional one-eighth grain. The asthma then ceased, heavy sleep followed, and no awakening.

Another patient I saw through a bad attack of typhoid fever. When somewhat better I transferred the case to a French doctor, as I was leaving Mentone. He at once gave morphine, as she seemed excited, and she died in a few hours.

A third case came lately under my observation, where a man had a severe haemorrhage from gastric ulcer. His doctor gave an injection of half a grain of morphine, followed the next morning by one-sixth more. The patient never came out of the comatose sleep which supervened.

This sort of thing appears to me to be going on to a far too great extent, and the consequences are masked by the presumption that it is the malady which is fatal and not the morphine. It is forgotten that half a grain of morphine to an enfeebled patient may equal in effect a much larger dose to a vigorous person, a practical fact which many medical men do not seem to realize.

Would it not be wise if some rule or law were introduced that no medical man should give more than one-quarter or one-third of a grain of morphine on any one day, without the confirmatory opinion of a colleague? We are dealing with a drug of great potency, applied often to a patient of low vitality, and it should be the patient's fault alone if he fails to recover.—I am, etc.,

Topsham, Devon, Sept. 6th. D. W. SAMWAYS.

SOUTH AFRICAN NATIVE PRACTITIONERS.

SIR,—Your valued correspondent for the Union of South Africa, in the JOURNAL of August 20th (p. 323), quotes without disapproval the opinion of the Hospital Survey Committee, to the effect that the medical needs of the tribalized natives of South Africa will not be met by providing for an influx of natives into the medical profession; and this because, it is alleged, "the qualified native practitioner is rarely content to practise among his own people in their tribalized condition."

As only a very limited number of South African natives have as yet attained to the status of qualified medical practitioners (thanks largely to the fact that the right to finish their medical education in their own country is denied them), it is easy to investigate the accuracy or otherwise of the committee's contention as regards them all, and this has been done.

A writer to the *East London Daily Dispatch* goes over each one of them by name, and shows that without exception they have all thus far preferred to go back to their own people to exercise the healing art. Even Dr. Molema, who is mentioned as an outstanding example of the supposed tendency, is, I believe, at work amongst his own tribe, the European cases of his which have caused such a stir being not of his seeking, and an almost negligible proportion of his patients. The writer referred to concludes his letter thus: "Consistent with the foregoing, Dr. Motebang, the latest medical recruit, is showing the same preference for Basutoland. In the face of this clear record of the past, what justification, then, is there for the allegation that native practitioners will 'drift to a large town'?"

I think, Sir, you will agree that in bare justice to the South African natives, and in particular to those of them who are members of our profession and holding British qualifications, these facts should be published, to be set over against the suppositions of the committee in its otherwise admirable report.

It is not always safe to argue (as the committee apparently has done) as to what an African will do, either from consideration of what a European would be likely to do in similar circumstances, or even from consideration of what other Africans in another distant part of that vast continent have done; and it is the considered opinion of many who have given much thought to the subject that the providing of facilities for the training of natives as medical practitioners *would* go a long way towards the solution of the medical difficulties of native South Africa.—I am, etc.,

DAVID M. BROWN
(Lubwa, Chinsali, N. Rhodesia.)

Annan, Dumfriesshire, Sept. 12th.

BREATHING EXERCISES WITH MOVING ARMS AND MUSCULAR INHIBITION.

SIR,—Dr. Gittins (August 6th, p. 239) rejects the view that a muscle elongated by some movement, during the movement, continues contracted or even becomes more contracted. Dr. Gittins strives to differentiate between "tension" displayed by a muscle and the "tone" produced by a muscle. He agrees that the "tension" of the pectoralis major is increased as the muscle is elongated by such a movement as raising the arm from the side; but, he adds, "it is surely unwarrantable" to deduce from this that its tone increases or that the muscle is in a state of contraction.

"Tension" is a characteristic of inextensible tissues, such as aponeuroses and tendons; the tension they present depends on their fibres (white connective tissue fibres), not on their cells, though the state of the fibres depends ultimately on the cells. Striated muscle when pulled on, under certain conditions, can easily be elongated: if it presents a "tension" under such circumstances, this must be due to the state of the muscle cells. The connective tissue fibres in striated muscle and even the cells themselves can only come into consideration as a factor causing "tension" when the limits of the greatest elongation of the muscle possible in the intact animal are surpassed. The changes in the cells of the muscle, tending to prevent elongation within the normal limits, can only be assigned to variations in the osmotic pressure of the cells, which is delicately affected by nervous impulses.

Thus, the "tension" of striated muscle is the effect in muscle produced by its "tone" or by its "contraction": it is the effect of the nervous system acting on the muscle cells. The "contraction" of muscle is simply an exaggeration of its "tone"—of its "tonic contraction." The tension of muscle varies with its tone and, other things being equal, the tone of a muscle varies with its length: when elongated in a movement its tone and thus its tension are increased. A reflex arc determines this. Muscle spindles, sensory in nature, exist. When the muscle is elongated, these muscle spindles are pulled on and generate impulses which, running up the afferent nerve fibres to the cord, affect the cells sending efferent impulses to the same muscles. Thus, when a muscle is elongated its contraction must increase unless it is inhibited by some superior force. Palpation in the normal, both in myself and in my dog, shows that such an inhibitory force does not come into play *during* movement; and the effects of strychnine poisoning, the phenomena of Thomsen's disease and of the muscle-bound individual seem to support this conclusion. During movement muscles elongated do not become slack. On the contrary, the force exerted by muscles elongated during a movement increases throughout the movement: the elongating muscles actively oppose and resist the movement, and in this way they guide the acting or maximally contracting muscles so that precise, "co-ordinated" movement results.

It has been supposed that the state of muscle during posture and movement is different. But active postures are related with active movements, passive postures with passive movements or no movement at all. During active posture we are alert and ready for the impingement of external forces or to exert ourselves on some environmental appearance; during passive postures we are incapable of such responses. There may perhaps be different innervations of striated muscle; non-medullated nerves may indeed supply some of the fibres. Such researches, however, cannot obliterate the results of even gross examination of the muscles in our own bodies as palpation gives: the current teaching of to-day does not explain these results; it requires modification before it can satisfy the postulates of the physiological experiments seen in a larger world.—I am, etc.,

R. H. PARAMORE, F.R.C.S.Eng.

Rugby, Aug. 21st.

"HANGED, DRAWN, AND QUARTERED."

SIR,—One of your correspondents throws some doubt on the capacity of the human organism to endure the shock of being disembowelled. It may be of interest in this connexion to point out that Harrison, a signatory of the death warrant of Charles I, got up and assaulted the executioner after being thus treated. Xenophon records, *Anabasis II*, v. 33, that one of the Greek captains came fleeing to the camp, "wounded in the belly and holding his bowels in his hands, and related all that had happened": *τετρωμένος εἰς τὴν γαστέρα καὶ τὰ ἔντερα ἐν ταῖς χερσὶν ἔχων, καὶ εἶπε πάντα τὰ γεγενημένα.*

—I am, etc.,

W. J. YOUNG.

Harston, Cambridge, Sept. 11th.

MÉNIÈRE'S DISEASE TREATED BY THE ELECTROPHONIODE.

SIR,—The interesting and important case described by my friend Mr. Arnold Ferguson of Jersey in your issue of September 10th (p. 454) is one which is highly satisfactory in the treatment of this difficult condition.

I hasten to endorse Mr. Ferguson's remarks by my own experience in two cases, one of which, a young lady aged 21, was published in the *Practitioner* for last August. In this case the vertigo, which was her chief complaint, disappeared entirely before the first fifteen treatments were completed, and she has since spent a holiday in Switzerland, where she practised mountaineering without difficulty.—I am, etc.,

MACLEOD YEARSLEY, F.R.C.S.

London, W.1, Sept. 17th.

"THE MEDICAL REGISTER"—UNTRACEABLE PRACTITIONERS.

SIR,—With reference to the letter which appeared in your issue of September 17th (p. 526), written by a practitioner who signs himself "Still on the Register," in regard to the list of practitioners from whom no replies have been received to the inquiries sent out from this office, I have to say that, in the case of practitioners in regard to whom it is improbable that a certificate of death will be received owing to their having died abroad, it is the custom of the Council to send a registered inquiry in order to comply strictly with the requirements of Section 14 of the Medical Act of 1858. This has proved to be a very necessary precaution. In the case of eminent men who at one time practised medicine but subsequently have taken up other careers, their names are included in the list in the ordinary routine; but, before names are erased from the *Register*, it is customary for the list to be carefully scrutinized, and as far as possible every precaution is taken to see that the names of those whose addresses can be ascertained and who are known to be living are not erased.

Your correspondent suggests that the *Medical Register* might be checked with the *Medical Directory*. I desire to point out that this is invariably done, and, if an alternative address is found in the *Directory*, an inquiry is forwarded to it. The publishers of the *Directory* used to be in the habit of inserting an asterisk before the names of those practitioners who had not answered the inquiry sent to them. This is no longer done, and the Council is not able to see whether the address inserted in the *Directory* is one which has been ascertained immediately before publication or not. I might add that not only is the *Directory* consulted, but every possible means of preventing erasure is adopted. Inquiries are addressed to the Ministry of Health, to the British Medical Association, and, if there is any indication that the practitioner has gone to the Dominions, the Colonial Medical Registers are searched, and no name is erased from the *Register* until considerable trouble has been taken to establish communication if the practitioner is still alive.

The following is a copy of Section 14 of the Medical Act, 1858, and it will be observed that the Council is under no obligation to do anything further than to send an inquiry to the registered address, but it does in fact make every reasonable effort to ensure that names shall not be erased if it can be avoided.

Duty of Registrar to keep the Register correct. "It shall be the duty of the Registrars to keep their respective Registers correct, in accordance with the Provisions of this Act and the orders and regulations of the General Council, and to erase the names of all registered persons who shall have died, and shall from time to time make the necessary alterations in the addresses or qualifications of the persons registered under this Act; and to enable the respective Registrars duly to fulfil the duties imposed upon them it shall be lawful for the Registrar to write a letter to any registered person, addressed to him according to his address on the Register, to inquire whether he has ceased to practise, or has changed his residence, and if no answer shall be returned to such letter within the period of six months from the sending of the letter it shall be lawful to erase the name of such person from the Register; provided always that the same may be restored by the General Council should they think fit to make an order to that effect."

—I am, etc.,
NORMAN C. KING,
London, W.1, Sept. 20th. Registrar, General Medical Council.

MINERS' NYSTAGMUS AND ULTRA-VIOLET RAYS.

SIR,—The note on the sympathetic system in miners' nystagmus (BRITISH MEDICAL JOURNAL, August 20th, p. 308) induces me to say that I have been treating cases of miners' nystagmus by general ultra-violet radiation for the last nine months and have found the results most disappointing. I cannot record a single case so treated that has shown any earlier alleviation of symptoms than have those treated merely by rest or light work.—I am, etc.,

G. F. HAYCRAFT, M.R.C.S., L.R.C.P.,
Wolverhampton, Aug. 24th. D.O.M. and S.

Obituary.

SIDNEY RAWSON WILSON, M.B., M.Sc., F.R.C.S.Ed.,

Senior Anaesthetist, Royal Infirmary, Manchester, and Lecturer in Applied Physiology and Anaesthetics, University of Manchester.

THE tragic death of Mr. Sidney R. Wilson last week removes a brilliant son of Owens College and a pioneer in the anaesthetic branch of the medical sciences. Mr. Wilson was found dead on September 12th in his study; on his face was a mask, such as is used in the administration of gas and oxygen, and he appears to have met his death while experimenting with this anaesthetic on himself. He retired to his room at 3 o'clock in the afternoon and was not seen again alive. At 5 o'clock he was to have given an anaesthetic at a nursing home, and a telephone message came to inquire why he had not kept the appointment. His wife found him dead in his room with the mask on his face and a strong smell of nitrous oxide gas in the air. Artificial respiration was performed for some hours without avail. He was known to be making experiments with the McKesson apparatus to find out the effects of different mixtures of nitrous oxide, oxygen, and air. The actual problem on which he was engaged was whether the anaesthetic properties of various gases and vapours were due to oxygen lack, or were produced by the action upon nerve cells.

Sidney Rawson Wilson was born in 1882 and was the third and youngest son of Dr. A. C. J. Wilson of Penistone. His father is still alive and in active practice in the Penistone district. He was a grandson of the late George Wilson of Manchester, the chairman of the Anti-Corn Law League, a well known Manchester worthy of his day, of whom a bust and oil painting are to be seen in the Manchester Town Hall. S. R. Wilson was educated at Owens College, and received his hospital training at Manchester, afterwards serving as house-surgeon at the Royal Infirmary. He graduated M.B., B.Ch. with honours at Manchester in 1905, and in the same year obtained the M.B., B.S. degrees of the University of London with honours and distinction. In 1902 he took the B.Sc. degree of Manchester with first class honours. He obtained many medals, scholarships, and exhibitions during the early part of his training, and, as a student, had a most distinguished career. Specializing in anaesthetics he came to be recognized as one of the foremost anaesthetists in the country, and he was a pioneer in many new methods. He was senior anaesthetist to the Manchester Royal Infirmary, and honorary anaesthetist to the Victoria Dental Hospital and Salford Royal Hospital. He held the post of lecturer in applied physiology and anaesthetics at Manchester University and lecturer in anaesthetics at the Dental Hospital.

He contributed numerous articles to the medical journals on the subject in which he was specially interested, and recently read a paper on anaesthetics before the Royal Society of Medicine. In 1922, in collaboration with Mr. A. H. Southam, he contributed to the BRITISH MEDICAL JOURNAL a paper on cancer of the scrotum, which was the first published work to draw attention to the occurrence of mule-spinner's cancer among cotton workers. This paper aroused considerable interest, both in medical and lay circles, and resulted in special legislation being undertaken by the Home Office to deal with the disease. More recently he published in the *Lancet* an article on ether convulsions, which he attributed to impurities in the ether used; this paper also evoked much interest and discussion.

A colleague writes: The death of "S. R.," as he was commonly known to a very wide circle of friends and colleagues, is a very serious loss to medicine in Manchester, and the news came as a terrible shock to those who had the privilege of his acquaintance. His death will be no less keenly regretted by the students at the University and the Dental Hospital, where his teaching and methods were greatly appreciated by all who came into contact with him. As an anaesthetist it was a pleasure to watch him, and there was never any cause for anxiety when "S. R." was in charge of the case. In addition, he was

a born teacher and had a gift of imparting his knowledge such as is given to few. His quiet voice when reassuring patients, and thereby gaining their confidence, will long be remembered by those who came under his hands. His gentleness and ability when dealing with children was a gift given to few men, and was a joy to see. While most of his time was fully occupied with his professional duties, he still managed to take an interest in sport; he was a familiar figure at many boxing contests in Manchester, and occasionally found time for a round of golf. A friend who spent holidays with him at the seaside noted the great affection he was held in by children; wherever "S. R." was to be found there was always a circle of young people around him. He is survived by a widow and two children. In a very happy family life his only cause for anxiety was, probably, for his son, who suffered from diabetes, and needed constant and watchful care. The interests and welfare of this boy were one of "S. R.'s" greatest concerns, and he was seldom so happy as when talking of his boy and helping him with his animals. The funeral on September 16th was a spontaneous demonstration of the affection and esteem with which he was regarded. The one consolation to his friends is that, though he has gone, his work and memory will live after him.

Many of our readers must have seen with regret the announcement of the death in Canada, at the age of 58, of Sir WILLIAM GLYN-JONES, who was for many years the leading figure in British pharmacy. In his early days he acted as dispenser to a succession of medical practitioners in London, and then set up as a dispensing chemist on his own account in the East End. He was intimately concerned with the foundation of the Proprietary Articles Trade Association, and was a vigorous member of the council of the Pharmaceutical Society of Great Britain from 1899 to 1904, the year in which he was called to the Bar. In 1908 he was appointed parliamentary secretary to the society, and two years later became M.P. for Stepney. In the House of Commons he rendered immense services to pharmacy and pharmacists, more particularly in connexion with the National Insurance Acts and the Poisons and Pharmacy Act. During the war he was for a time parliamentary secretary to Dr. Addison, and in 1919 he was knighted, shortly after his appointment as secretary of the Pharmaceutical Society. He resigned that post a year and a half ago in order to become chairman of council of the Canadian Proprietary Articles Association, throwing himself with characteristic energy and enthusiasm into the organization of that body. He had been chairman of the Association of Insurance Committees for England and Wales, and his textbook on *The Law of Poisons and Pharmacy*, published in 1909, is the standard work on that subject. In an appreciation, printed in *The Pharmaceutical Journal and Pharmacist* of September 17th, the Medical Secretary of the British Medical Association writes of the many opportunities he had of working with Sir William Glyn-Jones on behalf of their respective professions, and pays a special tribute to his signal services in connexion with the Dangerous Drugs Act and Regulations.

Dr. WILLIAM THOMAS EVANS, who died in the Cottage Hospital, Bromley, Kent, at the age of 75, was the son of the late Mr. Charles Evans, F.R.C.S., and was born in Bakewell, Derbyshire, in 1853. He received his medical education at Edinburgh, and graduated M.B., C.M. in 1875. After holding the post of resident surgeon to the Edinburgh Royal Infirmary, he commenced practice in Paddington, holding the appointments of medical officer to the west district of this borough and to the St. John's Training School for Girls, Westbourne Park. He was a member of the British Medical Association, of the Royal Medical Society, Edinburgh, and of the Harveian Society, London. He retired from practice in 1920 and settled in Bickley, Kent. He is survived by his widow and three children, one of whom is Major Douglas Gordon Evans, R.A.M.C.

The following well known foreign medical men have recently died: Dr. LOUIS DUBREUIL-CHAMBARDEL of Tours, president of the Société d'Anthropologie de Paris, an eminent medical historian and lecturer in the medical school at Tours; and Dr. F. W. TALLQUIST, professor of internal medicine at Helsingfors, aged 56.

Medico-Legal.

A SURGEON'S FEE.

AN action for the recovery of a fee for performing a surgical operation was heard by His Honour Judge Higgins at Exeter county court on September 13th. The plaintiff was Mr. R. A. Worthington, F.R.C.S., surgeon in charge of the throat, nose, and ear department, Royal Devon and Exeter Hospital, and the defendant was Mr. S. T. Pitts, Yelverton, the claim being for £70 7s., being 60 guineas for an operation on defendant's daughter and 7 guineas assistants' charges.

Mr. J. L. Pratt, for the plaintiff, said the operation was performed on defendant's daughter, aged 15, at a time when she was in the Exeter Isolation Hospital. The daughter was a boarder at the Maynard School. It was discovered that she was suffering from scarlet fever. She had her own medical attendant at the school, but as it was a case of scarlet fever arrangements were made for her to go to the Isolation Hospital, and at the parents' request she was put in a special ward. At the end of a month, January 24th, the scarlet fever was cured, and Dr. Stirk, the medical officer, would have been willing that she should leave hospital, but it was found that the girl was suffering from a discharge from the ear, and that an operation would probably be necessary. In fact, the girl would have died if an operation had not taken place. The matron of the hospital advised Mr. Pitts about this, and pointed out that in Dr. Stirk's view it was a case in which a specialist was needed. Counsel said defendant could have been under no misapprehension that he would be liable for the fees, because the usual notice as to this was sent to him.

Dr. P. H. Stirk, city medical officer, who is in charge of the Isolation Hospital, stated that defendant was present at a consultation on January 28th, when Mr. Worthington expressed the opinion that an operation was necessary. The local authority did not pay specialists' fees.

Mr. Worthington in his evidence said that at the consultation both Mr. and Mrs. Pitts were present. Witness advised an operation. Defendant did not consent then, but two hours later witness received a telephone message from Mr. Pitts authorizing him to go on with the operation. Witness found the condition of the child so serious that it was fortunate she was operated on. As to the fee, his usual charge for such a case was 100 guineas, but in this case he made a reduction.

Defendant: I should like to say, Dr. Worthington, that my daughter has done splendidly, and we deeply appreciate the skilful work you did.

The matron and a nurse at the Isolation Hospital spoke to conversations defendant's wife had with them as to what Dr. Worthington's fee would be.

Defendant said he had no evidence to offer beyond that disclosed by the documents.

His Honour said it seemed to him defendant was liable, and there would be judgement for the amount claimed. The defendant expressed his intention to appeal on a point of law.

Universities and Colleges.

UNIVERSITY OF DURHAM.

MR. RONALD B. GREEN, M.B., F.R.C.S., who has been lecturer on anatomy in the University of Durham College of Medicine, Newcastle-on-Tyne, for the past five years, has been elected to the Chair of Anatomy in succession to Professor R. Howden, whose resignation was recently announced.

UNIVERSITY OF LEEDS.

ON the occasion of the visit of the British Association to Leeds the honorary degree of Doctor of Laws was conferred by the University upon the President, Sir Arthur Keith, M.D., F.R.S., and that of Doctor of Science upon Professor J. S. Haldane, M.D., F.R.S.

The Services.

HONORARY PHYSICIAN TO THE KING.

HIS MAJESTY has approved of the appointment of Lieut.-Colonel S. R. Christophers, C.I.E., O.B.E., M.B., Indian Medical Service, as Honorary Physician to the King, with the brevet rank of colonel, with effect from February 15th, 1927, in succession to Colonel C. H. Bensley, C.I.E., Indian Medical Service, who has retired.

HONORARY SURGEON TO THE KING.

HIS MAJESTY has approved of the appointment of Major-General G. Tate, M.D., Indian Medical Service, as Honorary Surgeon to the King, with effect from February 27th, 1927, in succession to Major-General R. Heard, C.I.E., Indian Medical Service, who has retired.

Medical News.

THE annual prize distribution at St. George's Hospital Medical School will be held in the board room of the hospital on Saturday, October 1st, at 3 p.m., when the inaugural address, entitled "The meaning and methods of success," will be delivered by Sir Humphry Rolleston, Bt., K.C.B., M.D., Regius Professor of Physic in the University of Cambridge. The annual dinner of the medical school will be held at the Hyde Park Hotel on Saturday, October 1st, at 7.15 for 7.45 p.m., with Sir Humphry Rolleston in the chair.

THE opening of the winter session at the London (Royal Free Hospital) School of Medicine for Women will be held on Monday, October 3rd, at 3.30 p.m. The introductory address will be given by Mr. Robert G. Hogarth, C.B.E., F.R.C.S., senior surgeon, General Hospital, Nottingham, whose subject will be "The doctor's high calling." Academic dress will be worn.

THE opening ceremony of the winter session at King's College Hospital Medical School will be held on Friday, September 30th, at 2.30 p.m. The introductory address will be given by Sir Berkeley Moynihan, Bt., President of the Royal College of Surgeons of England. The annual dinner of past and present students will be held at 7 for 7.30 on the same day at the Criterion Restaurant, Piccadilly Circus, when the chair will be taken by Professor G. F. Still, M.D.

THE annual distribution of prizes at Charing Cross Hospital Medical School will take place in the out-patients' hall of the hospital on Wednesday, October 5th, at 3.30 p.m. The annual dinner of past and present students will be held at the Hotel Victoria, Northumberland Avenue, on the same evening, at 7 for 7.30 p.m., when the chair will be taken by Dr. Cuthbert Lockyer.

THE winter session at the Royal Veterinary College, Great College Street, Camden Town, will begin on Tuesday, October 4th, when the opening address will be given at 3 p.m.

THE eighty-sixth session of the School of Pharmacy of the Pharmaceutical Society of Great Britain will open on Wednesday, October 5th. The inaugural sessional address will be given by Dr. T. A. Henry, at 3 p.m., in the Society's house, 17, Bloomsbury Square.

THE Fellowship of Medicine announces that a course in cardiology will be held at the National Hospital for Diseases of the Heart from October 3rd to 15th, from 10 a.m. to 4 p.m. each day (limited to 20). The Central London Throat, Nose, and Ear Hospital will hold a three weeks' course from October 3rd to 22nd; the clinical and operative parts of the course may be taken separately or together. There will also be practical courses in peroral endoscopy, and in bacteriology and pathology suitable for D.L.O. students. Other courses in October will include ante-natal work at the Royal Free Hospital, at 5 p.m., on Fridays, October 7th to 28th (membership limited to 10); in diseases of children at the Paddington Green and the Victoria Children's Hospital, morning and afternoons alternately at each hospital, from October 17th to 29th; in electrotherapy at the Royal Free Hospital, on Wednesdays, at 5.15 p.m., from October 12th to November 2nd; in gynaecology at the Chelsea Hospital, from October 17th to 29th; in tropical medicine at the London School of Tropical Medicine, Tuesdays and Thursdays, at 2 p.m., from October 4th to 27th; and in neurology at the National Hospital, Queen Square, from October 3rd to November 25th. Copies of syllabuses and of the general course programme are obtainable from the Secretary of the Fellowship, 1, Wimpole Street, W.1.

A WEEK END post-graduate course at St. Mary's Hospital, Paddington, has been arranged. On October 1st Professor C. A. Pannett will deal with minor operative problems of general practice; Sir William Willcox, the treatment of pernicious anaemia; Dr. T. G. Stevens, Caesarean section and after; and Mr. Zachary Cope, retention of urine in an old man. On October 2nd Dr. Ernest Young will discuss the duodenal tube in treatment of gastric and duodenal ulcers; Dr. C. M. Wilson, early recognition of some common diseases; and Dr. John Freeman, blood transfusion. On October 3rd Dr. Wilfred Harris will deal with the significance of pain in the lower extremities; Mr. S. Maynard Smith with obstruction of the large bowel; and lantern lectures will be given by Mr. Aleck W. Bourne on recent work on the pituitary and ovary, and Mr. Duncan Fitzwilliams on early diagnosis of carcinoma of the tongue. The meetings are open to all medical practitioners without fee.

A SHORT course of lectures on functional nervous disorders will be given at the Tavistock Square Clinic for Functional Nervous Disorders, 51, Tavistock Square, London, W.C.1, commencing on October 10th. The fee for the course to medical practitioners is £2 2s. and to medical students 10s.6d. Tickets and full particulars of the course can be obtained in advance from the honorary secretary of the clinic.

AN international congress of hygiene will be held in Paris under the presidency of Professor Léon Bernard from October 25th to 28th, when the following questions will be discussed: Relation of insurance to public health, introduced by Kuhn of Copenhagen, Holtzmann of Strasbourg, and Brian of Paris; factors in the recrudescence of small-pox and the means of combating them, introduced by Ricardo Jorge of Lisbon, Jitta of the Hague, and Camus of Paris; hygiene of education camps, introduced by Sacquépée of Paris. Addresses will also be delivered by Professors Madsen and Ottolenghi. The subscription of 60 francs should be sent to the general secretary, Dr. Dujarric de la Rivière, Institut Pasteur, Rue Dutot 26, Paris XV.

THE P.L.M. Railway informs us that the through service from London to the Riviera will this winter run in connexion with the 2 o'clock boat train from Victoria via Folkestone-Boulogne instead of the 11 o'clock via Dover-Calais as hitherto. The arrival at Riviera destinations will, however, be only approximately a quarter of an hour later, thus shortening the total journey by two and three-quarter hours. The new service will run for the first time on October 25th next, and will provide the usual sleeping accommodation and also ordinary 1st and 2nd class seats.

DR. JOHN BEATTIE, research assistant and demonstrator of anatomy at University College, London, has been appointed assistant professor of anatomy at McGill College, Montreal.

A CONSIDERABLE epidemic of infantile paralysis is reported from Alberta. Fresh cases have been recorded daily, and the reopening of the schools has been postponed by the Board of Health. According to the Toronto correspondent of the *Times*, the medical authorities of Edmonton, the capital of the province, have appealed to the Rockefeller Foundation for assistance in combating the epidemic, and have asked that a representative may be sent to study the local situation.

A STATUTORY order issued by the Home Office will come into force on October 1st, requiring the provision of an adequate supply of water for washing and drinking purposes in factories and workshops in which gutting, salting, and packing of herrings are carried on. A first-aid dressing station must be established within 250 yards of the factory or workshop, and be in the charge of a qualified nurse or other person trained in first aid.

THE sixth Roumanian Congress of Oto-rhino-laryngology will be held at Bucarest on October 29th and 30th, under the presidency of Professor Predescu-Riou of Cluj. Papers will be read on foreign bodies in the trachea, bronchi, and oesophagus by Professor Bélinoff of Sofia and Dr. Fotiade, and on syphilis of the ear by Drs. Tempea and Costiniu, jun. Further information can be obtained from the general secretary, Dr. L. Mayersohn, 81, Calea Musitor, Bucarest.

THE annual statutory general meeting of the Medical Defence Union, Ltd., will be held at the Royal Bath Hospital, Harrogate, to-day (Saturday, September 24th), at 4.30 p.m.

THE annual dinner of the West Kent Medico-Chirurgical Society will be held on Wednesday, October 12th, at 7.30 p.m., at the Trocadero Restaurant, Piccadilly Circus. Tickets 10s. 6d. each, exclusive of wines, may be obtained from Dr. J. P. Purvis, 16, The Grove, Greenwich, S.E.10. Ladies are invited.

THE third annual Norman Lockyer Lecture before the British Science Guild will be given by the Very Rev. Dean Inge on the afternoon of Monday, November 21st, in the Goldsmiths' Hall. Particulars will be announced later.

THE Jewish Health Organization of Great Britain is a body which has the support of a large number of well known Jewish medical men. It appears also to be a very active body; and, although the annual report just issued is only the third, it possesses already some nine different committees. It promotes health education by means of lectures and publications; it is establishing an annual Health Sabbath in connexion with the Health Week of the Royal Sanitary Institute; and it is opening a clinic for nervous and difficult children. It is also engaged in inquiries into the types of visual defect and the prevalence of left-handedness in Jewish children, the mortality from cancer amongst Jews, and the comparative intelligence and attainments of Jewish and non-Jewish school children.

THE centenary of the birth of Villemin (1827–92), medical inspector of the French army and professor at the Val de Grâce School of Medicine, who discovered the virulence, specificity, and contagiousness of tuberculosis in 1865, will be celebrated at Paris, under the patronage of the President of the Republic, from October 15th to 18th, immediately after the French Congress of Medicine.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to "***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

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All communications with reference to ADVERTISEMENTS, as well as orders for copies of the JOURNAL, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the BRITISH MEDICAL JOURNAL are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

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The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 4361 Central).

QUERIES AND ANSWERS.

URINE STAINS.

"INCONTINENCE" writes: A patient is suffering from precipitancy and frequency of micturition, with slight dribbling after micturition, dating from the passage of a cystoscope several years ago, used for diagnostic purposes after a prolonged attack of renal haemorrhage, the cause of which was not determined. He is greatly troubled by the consequent staining of his shirts and trousers, when these are of light coloured material, and would be very grateful for information of any application which would remove this staining. Ordinary dry cleaning, and the application of benzol, petrol, and turpentine, have been tried without much effect.

BORING THE LOBULE.

"K. W." writes: Two of my women patients insist on my boring their ears for wearing rings, and I should like a few hints as to technique.

*** We have always looked on this procedure not as a surgical operation but as the survival of a barbaric mutilation, general some years ago, but now becoming rare and usually performed by jewellers. The method as described to us long ago was as follows: The lobule of the ear was pressed against a piece of cork, the eyes of the patient were shut tight, and a coarse needle was stabbed through the lobule into the cork; an open link of gold chain was then pushed through the perforation and suitable restoratives were administered. We suggest to our correspondent that, in order to magnify the importance of the rite, he should pass a small trocar and cannula through the lobule, after due aseptic and antiseptic precautions; withdraw the trocar and follow it out with a piece of silver or gold wire; withdraw the cannula, leaving the wire in the lobule, and then bend the wire into a ring.

INCOME TAX.

"WEST AFRICA" inquires what tax would be payable on an income of £1,900 (£875 earned), in his circumstances; he has three children, the eldest of whom is under 15 and in receipt of a scholarship of £150 per annum.

*** The duty is as follows:

Total income			£1,900
Deduct earned income allowance	£146		
"Married" personal allowance	225		
Children allowance (3)	90		
		461	
Taxable income			£1,439
Tax due at 2s. in the £ on £225		£ 22 10 0	
" 4s. " £1,214		242 16 0	
Total tax payable		£265 6 0	

If "West Africa" is a widower the personal allowance is £135, and the tax payable will be increased by £18.

DIAPHORETICS AND DIURETICS.

DR. F. G. GARDNER (Oxford) writes in reply to "Scrutator" (JOURNAL, September 10th, 1927, p. 476), who asked for suggestions for making diaphoretic and diuretic mixtures palatable: I suggest that aqua chloroformi as a vehicle will answer his requirements and make these mixtures "palatable and effective" without adding appreciably to their cost. A "cordial" mixture is, in my opinion, much more effective than one that is not—it certainly is more pleasant—just as food is much more likely to "agree" when it is presented in a dainty form.

LETTERS, NOTES, ETC.

TWO MEDICAL SAINTS.

DR. BASIL H. PAIN (Southborough, Tunbridge Wells) writes: While on holiday in Kent this year I found myself in the little parish church of "St. Cosmo and St. Damian in the Blean," to give it its full name, but called locally Blean. It is situated about three miles north of Canterbury. The names of these saints are rare in English churches. A full account of their lives and doings appears in Young's *Annals of the Barber Surgeons.* There one learns that they are the patron saints of the barber surgeons, that they were Arabians by birth, but dwelt in Aegae, a city of Cilicia. They practised medicine and surgery, but took no fees in payment. Naturally they were in high esteem. On the title page of the old Book of Ordinances of the Barber Surgeons they are represented as supporters of the coat of arms of the barber surgeons. One of the saints "holds a medical vessel in his right hand, while the other saint has a box of ointment and a spatula, indicative of their being professors of the healing art." The vicar of Blean told me that there were only two churches in the United Kingdom dedicated to these saints, and both were in Kent. He then showed me a stained glass window in the church. St. Cosmo (or Cosmas) is shown holding in his left hand a good big box of pills with the lid removed, and between the thumb and first finger of his right hand lies a well shaped pill. St. Damian is shown holding a pestle and mortar. They were martyred in Cilicia in the Diocletian persecution in 303 A.D. The vicar also told me that he had just returned from Greece and that there were at least fifty chapels dedicated to these saints within a few miles of Athens. I read "they ministered to all who applied to them, whether rich or poor," so they deserve to be kept in memory by the medical profession. Their "Commemorative Day," I see, happens to be September 27th.

*** The names of these two saints, with that of the Beloved Physician, are commemorated in the title of the Guild of St. Luke, St. Cosmas, and St. Damian, a Roman Catholic body with headquarters in London and a considerable medical membership.

TREATMENT OF WHITLOW BY X RAYS.

DR. A. A. MASSER (Penistone, Sheffield) writes to report the rapid recovery of a whitlow on his right thumb after exposure to *x* rays. He states that about three months ago he contracted a deep thecal whitlow, which also involved the terminal phalanx. A deep incision was made, but the thumb continued to discharge from two sinuses for nearly a fortnight, and so a radiograph was taken. Almost immediately after exposure to the *x* rays the pain in the thumb vanished, and by the following morning all discharge had ceased, the sinuses closing within twenty-four hours. The *x*-ray examination revealed necrosis of the tip of the phalanx. The thumb is now quite normal, except for a slight scar caused by the incision. Dr. Masser has been unable to find any reference in the literature to the therapeutic action of *x* rays in septic or inflammatory conditions, and in view of his own experience he suggests that small doses might be tried in the hope of accelerating the recovery of infected wounds.

EFFECT OF PARIS GREEN ON MOSQUITO LARVAE.

DR. PADMANABHA MENON, of the Ross Institute, London, has published in the issue of the *Journal of Tropical Medicine and Hygiene* for August 1st a short account of the effect of Paris green on culicine larvae—the report of some experimental work. He found that Paris green, vigorously shaken with water, sinks, and the granules are eaten by mosquito larvae, which subsequently die, though, in the very early stage of development, they seem to escape. Paris green was not found to be toxic to mosquito pupae.

THE UNMARRIED MOTHER AND HER CHILD.

THE ninth annual report of the National Council for the Unmarried Mother and her Child records the success achieved by the Council in the Legitimacy Act of 1926, under which an illegitimate child is legitimized by the subsequent marriage of its parents to each other, provided certain conditions are observed. Similar success did not attend the Bastardy Bill introduced into the House of Lords. The bill has now been modified in respect to the hearing of affiliation cases before the birth of the child; the payment by the father towards the support of the mother during the later months of pregnancy, and for confinement expenses; and the power to secure an affiliation order to be given to guardians or board of guardians in the event of insanity or death of the mother. An attempt will be made to introduce the modified bill in the House of Commons.

RECURRENT EPISTAXIS.

DR. W. NUNAN (police surgeon, Bombay), having noticed several inquiries about the treatment of recurrent epistaxis, writes to suggest resort to mental suggestion. "Anyone," he says, "who has had opportunities of observing the results of suggestion in cases of spasmodic dysmenorrhoea and menorrhagia, enuresis, and pylorospasm will have no difficulty in appreciating the value of suggestion-therapy in the control of contractions of unstriped muscle fibres."

"SUBINVOLUTION PERITONITIS." (?)

DR. DOUGLAS A. MITCHELL (Bath) writes: The histrionic genius of the vermiform appendix is so generally recognized nowadays that it is apt to be blamed for the large majority of lower abdominal infections where no other gross lesion is demonstrable. In recent years I have seen several cases of acute abdominal crises in women necessitating operation, in which the greatest elasticity of imagination was necessary to incriminate the appendix, but in which the following triad of conditions was present: (1) A heavy, bulky uterus, with the typical "doughy" consistency of "subinvolution," and covered with comparatively lustreless and almost drab-coloured peritoneum; (2) intensely red and congested, but not distended, tubes; (3) a quantity of clear or slightly sanious fluid in the pelvis, with hyperaemic reaction in the adjacent coils of small intestine. In the last two cases of this condition of which I have notes there was an interval of four months since the last (straightforward) confinement. In such cases, though the history and symptoms may give a perfect picture of fulminating appendicitis, no pathological changes are found in the appendix. If this condition is truly one of "subinvolution peritonitis," due to the direct transmission of organisms, or even toxic material, from the uterus along the tubes to the peritoneal cavity, and if the condition is at all common, it must enhance the importance of subinvolution considerably. It would be interesting to have the opinions of surgeons and gynaecologists.

NORMAL LABOUR AFTER CAESAREAN SECTION.

DR. J. L. BLONSTEIN (London, S.W.) writes: A woman, aged 22, had undergone Caesarean section two years ago on account of active tuberculosis of the hip-joint, when a five months foetus was removed. It was her first pregnancy. She came to see me when she was eight months pregnant. She stated that three hospitals had refused to admit her, unless she again submitted to Caesarean section. I found no pelvic contraction, no signs of hip-joint disease, and I decided to let her go to term. The child was in a vertex position. When labour started she had weak pains at long intervals for seven days. For two days she had strong pains at frequent intervals, but there was little progress. When I found the os dilating I gave a hypodermic injection of half a grain of morphine. She slept for an hour, and then I was sent for. Before my arrival the child and placenta were born. There was only one small tear. The child was healthy and weighed 8 lb. The puerperium was uneventful. I think this case illustrates the fact that, providing the pelvic measurements are normal and progress is carefully watched, there is no reason why a woman who has previously undergone Caesarean section should not be delivered normally.

CARDIAC RUPTURE.

DR. R. B. WILSON (Glengall Hospital, Ayr) writes to record the death of a woman, aged 63, from cardiac rupture. She had been in poor physical health for some months and was found dead in bed one morning. At the necropsy blood clot was discovered in the pericardium, and there was a rent 3/4 in. long in the left ventricle. Further, localized weakness of the fattily degenerated heart muscle had resulted apparently from a deep eroding ulcer, which was probably gummatous. The patient had been asleep, without any signs of distress, fifteen minutes before death, and there was no history of any undue exertion, recent or remote.

A STAIN FOR SPERMATOZOA.

DR. S. MALLANNAH (Hyderabad, Deccan) has found the following method of detecting spermatozoa in seminal stains an improvement on that of Hankin, which is commonly used in India. He cuts off a piece of cloth from the garments showing any suspicious stains of semen and places it in a sterile petri-dish containing a solution just enough to soak it. After labelling the petri-dish with the number of the case and the date, it is set aside for a few minutes. With a clean knife the film is scraped gently from the cloth on to a clean slide and spread gently. It is allowed to dry in air and then fixed with the flame of a spirit lamp, and covered with a few drops of carbol thionin. After a few minutes it is washed with distilled water and dried by being kept slanting, so that the water drains away. The portion of the spermatozoön which lies between the head and the tail takes the stain more deeply and is generally semilunar in shape. The horns of this semilunar body have a tendency to unite in front and the coloration elsewhere is generally very faint. This peculiar staining characterizes the spermatozoön, which can be easily distinguished from cells and bacteria. The staining is more intense towards the tail and less towards the front part of the head. In fresh preparations, however, the tail also becomes coloured, but in actual practice, when the specimens are old, the tails do not take up the stain. Dr. Mallannah adds that by this method he has obtained positive results in 85 to 90 per cent. of cases, in most of which two or three months had elapsed.

PREVENTION OF GOITRE.

"S. O." writes: The prevention of goitre is a matter of great importance to those who live in goitrous districts. Colloidal iodine and iodized sweets have been used successfully to treat goitre and many other conditions. Since iodized salt contains so small a quantity of iodine as to be useless, I venture to ask if any reader would suggest a simple, practical method of preventing the onset of goitre and of those diseases which are said to be due to deficiency of iodine. "Irish moss" is certainly useful in the treatment of goitre, but I have not used it for a sufficient length of time to satisfy myself that it will prevent goitre. It would be interesting to know if Sir James Barr (whose letter on this subject appears in the JOURNAL of September 10th, p. 470) still uses concussion of the spinous process of the seventh cervical vertebra in the treatment of thyroid enlargement.

DEFINITION OF INSANITY.

DR. F. H. STEGMANN (Kingston, South Australia) writes with reference to the remarks on the absence of any definition of insanity made by Mr. Justice McCardie, as reported in the JOURNAL of June 4th, 1927 (p. 1038), to say that Dr. James H. Macdonald, of the Hawkshead Mental Hospital, Glasgow, gave the following definition: Insanity is a more or less permanent disease or derangement of the brain producing disordered action of the mind in such a way as to put the subject into a condition varying from his normal self and out of relation with his environment, and at the same time to render him dangerous or inconvenient to himself or his fellow men. Dr. Stegmann thinks that by adopting a definition such as this medical men would save themselves from adverse cross-examination tending to discredit a case.

THE CUBAN LEAGUE AGAINST CANCER.

CUBA is following the example of other countries in making efforts to reduce the mortality from cancer. It has its anti-cancer league undertaking to collect and distribute information relating to cancer, to promote the study of the disease, and to educate the poorer population in the knowledge of what science can do in the way of alleviation and cure; and recently it has given an earnest of its determination to show definite results from its mission by the gratuitous distribution to all the practitioners in the Republic of a volume of over 150 pages dealing with the important subject of early diagnosis. The book contains descriptions of the disease as it affects the principal regions of the body and is written by specialists. As it is designed for the benefit and instruction of practitioners, they are addressed without reservation in a short introduction by Dr. Diego Tamayo. It is, perhaps, difficult, in this country, to realize the particular attitude of the practitioner which is customary in other countries having other ideals. Thus in some countries the practitioner is reluctant, through good nature, to hurt the feelings of his patients by making a diagnosis of cancer. This may not be the case in Cuba, but there appears to be a species of religious superstition in the island that cancer is an incurable disease. Dr. Tamayo lays emphasis on the responsibility resting on the medical practitioner. He declares that the doctor who is jealous of his professional prestige must devote serious consideration to the opinion he gives, since it is better frankly to confess inexperience than to be compelled to rectify a diagnosis when, perhaps, it is too late. He should remember that a patient who is told that he is suffering merely from a non-malignant growth will expect a rapid cure, and if this does not follow the treatment recommended, other advice will be sought, and should there have been an error of diagnosis or an attempt to deceive, this fact will not remain a secret. No less reprehensible is a rash and ill-considered resort to intervention in the form of an incomplete operation or the employment of caustics and other local applications. If a case is operable and the practitioner has not the personal equipment for performing a radical operation, he should send the patient to those possessing the necessary experience or to a hospital. The volume is evidently designed to impress the practitioner with the necessity of ascertaining to what extent cancer is curable in these days, and of learning how to recognize it in the early stages, instead of dallying with it in ignorance until the patient's condition has become hopeless.

ERRATUM.

IN the preliminary note on the proceedings of the Section of Mental Diseases at the Annual Meeting at Edinburgh (July 30th, p. 165, col. 2) it is stated that "Dr. Groves described a case of recurrent mental illness in a girl . . ." The speaker was not Dr. Groves, but Dr. T. C. Graves, medical superintendent of Rubery Hill and Hollymoor Mental Hospitals, Birmingham.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 37, 38, 39, 42, and 43 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 40 and 41.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *135*.